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HOW SHALL I TAKE
EXERCISE AND SET-UP?

HOW SHALL I TAKE
EXERCISE AND SET-UP?

A PHYSICIAN'S ANALYSIS
OF THE
WHY AND WHEREFORE
WHAT'S WHAT
AND OF
WHAT'S WORTH WHILE
IN
EXERCISE
WITH ILLUSTRATED MOVEMENTS

BY
SAMUEL DELANO, M. D.



BOSTON
THE FOUR SEAS COMPANY
1918

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To
P. W. S.
SOUL OF GENEROSITY: PRINCE AMONG DEMOCRATS

46505

All-Round: Four-Square: Exercise

Natura Duce

CONTENTS

	Page
PREFACE	9
ARGUMENT	14
CHAPTER ONE—NATURE OF EXERCISE	19
CHAPTER TWO—MUSCLE AND CIRCULATION	25
CHAPTER THREE—BREATHING	30
CHAPTER FOUR—THE FULL BREATH	35
CHAPTER FIVE—ASPIRATION OF THE THORAX	40
CHAPTER SIX—THE CHEST	46
CHAPTER SEVEN—GAMES AND SPORTS	50
CHAPTER EIGHT—POISE AND SET-UP	57
CHAPTER NINE—ROUND SHOULDERS	65
CHAPTER TEN—THE BEST EXERCISE	68
CHAPTER ELEVEN—MUSCLE	77
CHAPTER TWELVE—THE ORGANIC LIFE	84
CHAPTER THIRTEEN—PHYSICAL CULTURE	89
CHAPTER FOURTEEN—EXERCISE IN HEALTH	94
CHAPTER FIFTEEN—EXERCISE IN ILL HEALTH	99
CHAPTER SIXTEEN—WALKING	103
CHAPTER SEVENTEEN—FAT	109
CHAPTER EIGHTEEN—REST	112
SCHEME OF CHEST MOVEMENTS FOR EXERCISE AND SET-UP	117
ESSENTIAL FEATURES COMMON TO THESE MOVE- MENTS	121
NOTE	134

PREFACE

THIS book is not a treatise. It is not filled to the brim with so-called science. There is no science of exercise and within will not be found even a demi-semi-quaver of what would look like science. All is empirical: the condensation of daily observation and of daily experience with exercise and with the body in health and disease.

Something daily done for the sake of exercise these forty odd years combined with ample opportunity for observing the phenomena of life in health and illness, would seem to give a man warrant for producing his conclusions. In the course of much pondering on the subject of exercise, the book has written itself. If it had not a message, we should most earnestly regret making even a small addition to that smothering pile of books (would that one might say *pyre*) even a glimpse of which is bewildering.

Existing books that deal with this subject we find far from satisfactory, because written by physical instructors or, if by M. D.'s, largely by men whose M. D. represents merely, medical study undertaken, it would seem for the most part, with the object of adding M. D. to the title of Physical Director. Later

on we find these men pronouncing a verdict on hearts, perhaps. But the effect of exercise on hearts can properly be investigated only by one who has had great experience with hearts in disease.

Thus the blight upon authority is that men at the head in physical matters are first of all experts in so-called exercise systems and perhaps never well-generalized physicians. From their almost too intimate association with systems and methods they are exposed to the suspicion of being special advocates; propagandists in fact. They know perhaps a lot about kinetics and mechano-physics but not enough about vital physics.

It is from this point of view that the book has a mission, we hope. After a long incubating it has seemed worth while to hatch out. The work is written not only for the man who moves, but quite as much for those who live and have their being. They, not athletes, are in the majority. And we are not without hope that even athletes, as we have seen them, may learn something to their advantage.

That is not to say that we will force a quarrel with present methods. We have left no room for sensational sparring. Sensationalism never made an argument nor much of an observation. To estimate the possible harm in severe forms of exertion is set about with enormous difficulties, because the body is a wonderfully accommodating organization and many of the harp's thousand strings may be broken or out of tune

and yet the harmony not seem to be disturbed. So that the judgment to be pronounced on modern athletics must be at a safe remove in point of time and bias.

Our object has been to parade the general principles of exercise as we have worked them out from what we deem coigns of vantage these many years. It may seem simple but much of importance in life escapes notice and proper appraisement because it is simple. Our theme is precisely the *simples*, i. e., the primary principles, of exercise.

The ideas are entirely our own. There are none borrowed. We do not have to make acknowledgment to any other work. There is no "bibliography." Indeed, we may safely say that the ideas do not appear elsewhere. We have yet to see a work that asks and attempts to answer the question, "what is exercise?" Our eye has failed to meet in print any words about breathing that take notice of anything more than the commonplaces of oxygen intake.

Our *leitmotiv* is that, in exercising, one must co-ordinate with Nature: that one may not dissociate exercise from organic life—that on the contrary one must yoke the twain, otherwise exercise is a task. We speak the gospel of the conservation of energy. By that we mean that energizing shall go to the limit of renewal but not of dissipation.

We find that Americans have too much "go". That when they think of exercise they think in terms of

"go". In this respect the author would not be classed as a reactionary or an obstructionist. He knows very well by experience what good hard muscular exertion is. He admires American "punch" as much as anyone—when it is in place. But he has come to think by long observation that a great deal of energy is frittered away.

While you may lash and goad the human frame into doing a wee bit more: after all, merely natural efforts will suffice for a nearly maximum yield in the long run. The late W. B. Curtis observed, of records and the like, that the clipping off of seconds and the somewhat greater cleverness of the stunt were to be imputed simply to more prolonged training, with attention to the minutest detail, and to improvement in paraphernalia. The human factor remains a more or less constant quantity.

Therefore, as to the severe muscular energizing, the question arises, and may be properly raised, whether the price paid is worth while? Nobody knows exactly the price paid; but if a man be drawing upon that precious fund of vitality that is a provision for the enjoyment of sound health even to old age, then he is needlessly squandering his patrimony.

If possible, exercise ought to be studied from the point of view of sanity. That famous schoolmaster and sterling disciplinarian Francis Gardner, used to thrust out towards us boys a pair of well-forked fingers. That meant that you were between the horns of the

dilemma. "Was that pertinent?" he asked. Did the boy waver or simper "No", quick followed his thundering "Then it was impertinent." Of course later years taught us that there was something intermediate, viz., non-pertinent, that should have helped us to escape the impalement.

Our plea is for sane exercise. That is not to say that exercise can be in-sane. We are, though, of the opinion that it can be non-sane, which is not so very different from nonsense.

SAMUEL DELANO

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ARGUMENT

No well directed exercise without theory and precise definition! Prevailing ideas vague, hence disorderly. Thus, (recent work on hygiene) "Best exercises are those bringing into action large groups of muscles and developing the body as a whole."

One may know what "exercises" are without knowing what exercise is.

What is "development of body"? To have for display legs and arms of a Hercules? The real body within, not without. Organic life has a muscular system all its own. This, "involuntary" muscle because beyond direct control of man. Muscle, as we know it, "voluntary". Exercise is to co-ordinate the muscular system that is ours with that which is not exactly ours (viz., organic).

"Bringing into action large groups of muscles." This again indiscriminate; = work. Possible, however, to use muscle as a basis of rest. Exercise may be restful. The muscular definition of exercise puts accent on wastage = work. Work, a study in exhaustion; exercise, in stimulation and activation. There is muscle and there are muscles. The finer and more

delicate the muscles, the more important to man. The muscles of the neck cut a vastly greater figure than the muscles of the calf.

As involving muscle, exercise on the hither side of work. Exercise through medium of muscle, salutary; muscle work not always so. Exercise concerned with muscle as an exquisite apparatus; work, with muscle as a machine of so much horse-power. Necessary to make exact distinction.

How make explicit the connection between without and within; between external performer and internal instrument? Answer is: through circulation. This the key. This the revelation to teach what it profiteth a man to use his muscles. The use of muscle is exercise, chiefly as one has used it to favor circulation.

By this, mean the equalization or the establishing of a balance. Cyclosis of the blood says: flowing from heart and *back again*. Exercise examines mechanical agencies rather than chemical. Chemical a part of organic life. Thus, accumulation of Carbonic Oxid stimulates respiration through irritation of respiratory nerve centers; but the part of exercise, to develop control of apparatus of respiration so that it may better respond to command.

Necessary to study the mechanical influences governing the circulation.

1. The energy of the heart's action is added to by the resistance offered through muscular contraction: in moderation.

2. But muscular contraction in excess, an *obstacle* to circulation, because accompanied by fixation of chest.

3. Control of circulation through breathing. Movement of fluids towards chest termed Aspiration of the Thorax. Direct ratio between highest degree of this and widest respiratory excursion.

4. Necessary then to study respiratory act. Respiration, simply swing of thorax under muscular influence. Importance of control of this apparatus. Absolute value of *voluntary* muscles of respiration.

5. The full breath resolved into its component parts.

6. Circulation markedly influenced by exhilaration. Blood channels are widened through influence of sympathetic nervous system. Relation of games and exercise.

7. The muscles of the body and neck as furnishing the muscular apparatus whose function is at once that of respiration and of set-up and poise.

8. Thus circulation, respiration, set-up, intimately associated with exercise, if this be properly defined.

9. Way now opened for assembling of muscles of body and neck with these functions in view. The action of these muscles to be molded into constructive movements to favor circulation both directly and indirectly. (Author's movements).

10. The same activities to be combined for the production of poise and set-up. (Author's movements.)

11. Kindred topics discussed from the point of view of this estimate of exercise.

HOW SHALL I TAKE
EXERCISE AND SET-UP?

CHAPTER ONE

NATURE OF EXERCISE

WHAT, after all, is exercise? Its etymological connection with *exercitus* (army) naturally brings to mind, what in reality has come to be the rigid conception, viz., an exaggerated degree of bodily activity, through the medium of muscle, such as might have fitted one in the Roman days for the hardships of soldiering (*strapeziren* the German has it.)

It is remarkable that the defects of this conception of exercise are not more obvious nor more frequently emphasized; its characteristic is its narrowness, as not applying to the bulk of human creatures in their everyday setting, and its assumption that the means justifies—nay even more, is the end.

If the destruction of the poor is their poverty, so likewise with the familiarity of familiar things. As Goethe said of life: "*jeder erlebt es, nicht vielen ist's bekannt*"—"Life—all live it, few know it"; which might be paraphrased to fit the case by saying that—we all know when we are well *exercised*, few when they are *well* exercised. Thus one speaks of exercise, and in the same breath of *an* exercise.

Man may go an-exercising as he goes a-fishing—much depends upon the catch. If one says broadly that energizing is exercising we reply that it is true that energizing comprehends but does not define exercise. For mere energizing is the basis of work and equally of killing work at that. But the search ought to be for a conception of exercise so comprehensive that one may be left in no doubt as to its place in life or its application to the especial situation of each individual.

Since muscle gives us the readiest exhibition of energizing, mankind falls into the error of assuming, without farther examination, that muscular contraction is exercise. Out of this fundamental error have sprung many fallacies. Thus, man conceives the body as a machine. He measures exercise by fatigue. He invokes physics and hence concerns himself with footpds., urea, and chemical quantivalence—or with that product of modern biology, toxines.

But fatigue is nervous in its origin and even if one use muscle to produce it one is nevertheless forced back upon a measure quite other than the chemical products of muscular activity. Reading aloud is very fatiguing. Mere effort without muscular exertion may throw one into an intense perspiration. A patient with complete muscular paralysis from the disease known as *paralysis agitans*, we have seen exhibit heat and perspiration from the mere conscious effort to move, when actually the slightest voluntary muscular motion was denied her.

Muscular exertion of and by itself then, comes under the head of work. For a working man or woman there should be a good and sufficiency of muscular exertion in the labor. The obsession of the muscle criterion of exercise could not exhibit itself in a more flagrant form than in the very common insistence that a given form of exercise, or the exercise involved perhaps in a certain occupation, is not complete because forsooth not every muscle is brought into play, or in other words, is defective because not symmetrical. Under this tenet there could be no really finished exercise until one developed and brought into use the rudimentary muscles, such as that which wags the ear.

It is not difficult to trace the origin of this conception. If the idea of exercise be identified with a sense of effort then it would follow that the employment of the muscles *en masse* up to the point of maximum energy, involves the greatest amount of exercise. But our idea is that there is something interposed between the means—muscle, and the end—exercise; that this intermediate something is of the highest importance and needs expounding. Exercise, it is true, involves the use of muscle—so does life, but the employment of muscle with reference to function and teleological value insists that we should proceed intelligently but not haphazardly.

The *reductio ad absurdum* of the dynamic view of exercise might be illustrated by a man taking a dumb-bell in hand, resting elbow on a table and flexing the

forearm on the arm. If he increased the weight and the number of contractions daily, we may be sure that the biceps would respond by increasing in size and power; there would be much work done, as measured by footpds., but what of exercise? From our point of view a negligible quantity thereof, in no sense proportionate to the time and effort!

Muscular energizing comprehends real exercise, but only as the oyster does the pearl. Only as a machine, does the body obey the laws of kinetics and physics. As a vital machine, however, it must submit to the laws of life—as to which, observation, experience and medical science, should have rather the most to say.

The problem of exercise is, by taking thought, to add an increased measure to the constant organic activity, to stimulate the organic while at the same time sustaining and confirming it; to keep the ebb and flow of organic life as regular as the tides, with perhaps an occasional high tide and over-flow.

Real exercise, then, is orderly and sustained—it introduces as little disturbance of the organic life as is consistent with a stimulation of the same. The heart and breathing are not to be unduly juggled. Things done in combination with poise, become more important, than those done in confused activity. In accruing benefit, a full breath in a relaxed state far outstrips the spirometer.

Reverting now to our illustration of the arm, the dumb-bell and the biceps, why does that operation

furnish very little exercise? Because it takes no cognizance of the organic life, which for our purposes narrows down to the circulation.

Exercise then may be thus defined—, ANY BODILY ACTIVITY THAT INFLUENCES FAVORABLY THE CIRCULATION. This definition makes for symmetry, in that it furnishes us a test and covers a far greater field in the domain of life than does muscular activity. It is truly catholic and broadens the range of exercise from so simple a thing as a hearty laugh to the most extreme bodily exertion. From this point of view this book has been written and as we shall see, the circulation test furnishes us an admirable touch-stone for ascertaining the value, or even the element of injury, in many activities.

For the working man or woman, work ought to supply sufficient muscular activity. For the child, play likewise. But what shall we say of the many men and women that neither work nor play in the real sense? Even for them exercise is not forced draught. The lazy man says exercise is "work for the other fellow to do"; the boy conceives it as "knocking the stuffing out of himself." Somewhere along this wide gamut, with the aid of our definition, the proper prescription of exercise lies.

One evil of the prevailing misconception of exercise is, that silent unobtrusive exercise is entirely left out of account. If the index to exercise is to be muscular activity, then the demand arises for something tangible,

something in evidence. Hence, men are convulsed by a desire for exercise in quintessence—in tabloid form so that it may be taken and have it over with.

But to the author, exercise is, like happiness, a part of the mixture of life—neither is to be obtained in chunks, by filtration, or as a *magma* by precipitating. If the correct view to take is that, even as men breathe they are exercising, and exercising in an important way, then we shall dispense with much of the systematic effort to coerce and to harness that which should be free and untrammelled.

CHAPTER TWO

MUSCLE AND CIRCULATION

As between muscle and circulation we insist upon circulation as the corner stone of exercise. The body is 70% fluid. Instead of comparing it to a machine one ought to liken it to a sponge, a delicate frame work permeated with channels and filled to saturation with fluid. The normal body, like the universe, is in a state of constant flux. From the more obvious flow of currents in wider channels down to the steady ooze in the cells, there is never stagnation.

As the Good Book has it "the life of the flesh is its blood thereof." All sickness with constitutional disturbance is productive of stagnation. Hot dry skin, inflammation etc., means stagnation of blood. Diseases of organs originate in cell necrosis and degeneration, which means a dead current. Given good blood and assurance of its proper conveyance on its rounds, and we have health.

The heart is the pump to which the same fluid returns, but not through the heart's agency. There are other factors at work, notably the Aspiration of the Thorax. But muscular action does much of course to bestir the circulation. The alternate contraction and

relaxation of muscle tends to pass the blood along. Paradoxically, however, the contraction imprisons the blood. It is not hard to see that exaggerated muscle action might imprison too much blood and deprive other more important structures of their supply. Without doubt this over-feeding of muscles, in repeated, prolonged, and violent use of them, is instrumental in forcing their growth and producing what amounts to a real hypertrophy. But in nature no hypertrophy is desirable; it is one-sided and a matter of mal-adjustment.

Muscular action undoubtedly stimulates the action of the heart by offering a general resistance. It is perhaps not likely that it produces a real and lasting hypertrophy of the heart, because the heart is a very accommodating organ; but it can, we believe, produce a dilatation of the heart. This, though it is to be laid at the door of severe muscular contraction, is brought about in an indirect manner the exposition of which is to be found in the succeeding paragraphs. We shall put much stress upon the relations of the chest and circulation and shall preach the necessity of exercise permitting as much freedom of the chest as it consistently can.

On the contrary, muscular contraction with resistance carries with it conditions that impose the opposite. One must have a fulcrum for the power to work from. All forcible actions of the muscles are done with a chest absolutely full. It is impossible to

put vim into any action if the chest be deflated. First, a complete inspiration is made—then by a closing of the vocal chords (glottis) the air is imprisoned and the firm torso is used as a fulcrum. As occasion necessitates, the breath is rapidly exhaled and caught up again. This of course induces a very irregular respiration.

The amount of actual tissue making up the structure of the lungs is surprisingly small. It furnishes only a very slight framework, for containing the air. This framework is continued by ramified subdivisions as far as the most minute air cells. Important to note, is its elasticity. At the end of a full inspiration the framework will be stretched to its utmost extent by the entering air. First in action have been the muscles whose function is to tug at the thorax (See chapter on Breathing). The thorax has expanded—the air has rushed in. Now comes the final step, viz., the complete distension of the air cells. The full breath involves in fine the overcoming of the inherent elasticity of the cell walls.

Here is the peak of the wave. But it should go no farther. Just as a piece of rubber can be worn out by over-stretching, so can the elastic fibre of the lung; though here is a vital elasticity quite different from that of dead matter like rubber. This elasticity figures in expiration.

Expiration is for the most part a relaxation, not an act. The muscles controlling the thorax yield, the

chest sinks towards repose and a considerable part of the air is expelled. But the *end* of expiration is an act—not on our part but on the part of Nature. It is the organic life that scores. That is to say, the elasticity of the air cells, though not within our control, does however, of itself, complete the job of expiration.

It ought now to be plain why one should not hold after a full breath, and equally, why so far as possible one should avoid the extreme distension that goes with severe muscular strain.

In the first place both acts tend to inflict a damage on the elasticity of the lungs themselves. In its end results this is the disease known as *emphysema*—in which the air cells have lost to a greater or less degree their power of contractility and the lung stands more or less permanently expanded, expiration being seriously interfered with.

But secondly, when the air spaces are distended to their full capacity, the glottis closed, the chest fixed and used as a fulcrum for severe muscular action, we have another point to consider. Since the pulmonary blood channels run in the very thin partitions between the air cells—distension and fixation of the air spaces must effectually compress the blood spaces, in other words put a complete check upon the circulation.

The pulmonary circulation originates in the right side of the heart. The right ventricle is its pump. If then, after a full inspiration, the breath be held,

as it always is during severe muscular exertion—it follows that the right heart is engorged by the blood thrown back upon it when the current is dammed.

This is a very important consideration in connection with muscular exertion. The heart is very adaptive—hence it does not follow that a permanent dilatation is produced—but temporary dilatation there certainly must be. Along the lines of this thought it is interesting to consider the phenomenon known as second wind. First in order is the distress, to be succeeded by a very surprising easement. During the distress undoubtedly the right heart is overwhelmed; its cavity does not immediately dilate and it cannot get a grip upon the mass of blood thrown back upon it. Later though, the dilatation and the contraction adjust themselves, so that all is well again if the ratio be not disturbed. Just so, side-ache on the right seems likely to be owing to engorgement of the liver—the liver relation to the right heart being of the closest.

Quite otherwise runs the scientific explanation of second wind. It makes resort to toxæmia from the sudden production of toxins through muscular effort. We hit it up too quickly, take the system by surprise, temporarily overwhelm it with toxins, and not until a balance between waste and elimination, between toxin and antitoxin, is struck, is the distress relieved. Thus the fine-spun theory of science! (*cf.* Chap. 11).

CHAPTER THREE

BREATHING

Nor to know how to breathe to best advantage and to completeness, is not to keep health. More temporary ill-feeling and no doubt permanent disease is conditioned upon neglected breathing than upon any one fault in the mechanism of life. One sacrifices a ready method of keeping well.

Neglect is not hard to understand—most persons give no heed at all to their breathing because Nature does not require us to (except only when she commands sigh or recommends a gape). Breathing is a part of the unconscious, subliminal organic life. So long as we live, even if we only vegetate, the wonderful mechanism of Nature sees to it that there shall be no failing in the rhythmical play of the breathing apparatus.

This is of course all the time being interfered with by our own selves. Quite unconsciously, it can be stimulated from within, as when a gust of passion sweeps across us; or it can likewise be inhibited by depression and low spirits. Still, all these manifestations: normal, exaggerated, restrained, are a part of that involuntary organic process, governed, as it

is known anatomically, by the sympathetic system, but linked up to that great secret in the hands of our Creator,—the mystery of life. The breathing that we have just been describing is known as *involuntary* respiration because for its maintenance there is no need of one making a wilful effort or even of taking thought.

Very great augmentation or reinforcement of respiration, however, may be wrought through the medium of *voluntary* control. Through this it is possible not only vastly to increase the proportions of organic interchange but to control and influence processes. Hence, voluntary respiration is of outstanding importance. As a preliminary to an understanding of this, however, there is need of a clear mind as to the mechanism of respiration.

It is unfortunate that forcible respiration at least, is made noisily. This is responsible for the notion that we draw air in and then expel it; which is entirely erroneous and deserving of explicit correction, because the exact idea of what one does is very essential to the author's conception of exercise.

The thorax is a pliable cage holding the lungs, heart and great vessels; its sides made up of ribs, costal cartilages and breast bone: closed below by the diaphragm: open above through the throat: and fixed to the spine for its firm support.

Breathing is primarily nothing more nor less than the expansion of the thorax through the shortening of muscles in activity. The involuntary part is at-

tended to by the diaphragm and the lower intercostal muscles. But the thorax is subject to the control of a large number of voluntary muscles (i. e., muscles contracting in response to our will) and this part of the apparatus is of preponderating importance. These forces are termed the *voluntary or accessory muscles of respiration*.

As we have said, the expansion of the thorax is the only act in inspiration. One must not forget that the air of the lungs is continuous with the atmosphere about us. It is all one atmosphere. After one has increased the dimensions of his thorax through agencies outside the same, the atmospheric pressure does the rest, forcing air in to fill what would be otherwise a vacuum. Man expands his thorax from without. Nature expands the lungs and fills the chest from within.

The increase in the dimensions of the thorax then, is breathing. Since the expansion of the thorax produces an inspiration we might almost say that *inspiration* is breathing. Expiration is not an act but a state: on the part of the thorax a mere relaxation, with the active cooperation of the elasticity of the lungs, and a return to the *status quo*.

Beyond that point one should not go. Any attempt to force expiration is uncalled for, if not actually bad in results. It can be done, but produces a negative pressure that at least does no good. One must, however, allow time enough for all the tidal air to leave

the lungs, and this means much more time for expiration than is commonly accorded it.

Especially in the full breath must one be very deliberate in the expiratory phase, allowing the diaphragm to resume its upper station, preparatory to its downward descent. Counting, then, during expiration, is a false piece of theory. Just as straining at the peak of a full inspiration is uncalled for. The more rhythmical we can make respiration, the more gain. The very fullest respiratory act should be equally as steady as the breathing that ordinarily serves us.

All the muscles attached to any of the bones making up the thorax, and extending to outside bones, are muscles of respiration. The contraction of the same is a tug at the thorax—ribs are raised or pulled outward and thus the total of dimension is increased. Many of the muscles coming from the head are capable, through the medium of the neck, of becoming muscles of respiration, if the head be fixed.

We may call the *platysma* the last voluntary muscle of respiration. This is a fan-shaped series of muscular bands, starting from the corners of the mouth and connecting with the upper chest. It is the muscle that produces the last gasp in the dying—as if Nature in her extremities called upon her final reserve in a supreme effort to prevail. So in sprints, you may, in a hard finish, note its action in the drawn-down mouths of the runners. Here likewise the thrown back head

represents an effort to tug at the thorax through the neck muscles. (*cf.* Chapter 11).

We shall here only refer to the fact that when air pours into the widened and elongated thorax, fluids do, too. This results in the so-called Aspiration of the Thorax. In other places we shall amplify the discussion of this really central power. Again, the control and use of these voluntary muscles of breathing encroaches upon the question of poise and carriage, because these muscles, in large part, sustain the double function.

Organic breathing, then, suffices for vegetative life—but voluntary breathing is necessary for vigor. Nothing pays so well as the cultivation of the voluntary muscles of respiration in point of development and control. The way thereto is through the medium of conscious use of these same muscles, in chest movements and set-up.

CHAPTER FOUR

THE FULL BREATH

It is not enough to say "take a full breath." One must know how ; by previous exercise have strengthened and gained control of those muscles (*accessory muscles of respiration*) that will accomplish it. While Nature has given us, through instinct, some idea of what the mechanism of a fuller breath is and how to arrive at it, the power is immensely extended by analysis and practice.

To tell a person to take full breaths, without any further instruction, i. e., leave it to his instinct, is as futile as to tell a man to stand up straight. Each act is a quite composite one, not intricate to be sure but to be accomplished only with understanding. Both standing-up-straight and taking-a-full-breath are rhythmical acts to be started right from the ground floor up, so to speak, and to be continued by muscular activity, *seriatim*, until the peak is reached.

For the full breath one must be recumbent. The standing position is unequal to it, because some of the muscles that one would use are employed more or less in keeping the balance.

The respiration apparatus divides roughly into halves by an imaginary transverse sector passing

through the pit of the stomach. The parts below this plane participate first. This means diaphragm, abdomen, and lower ribs. The diaphragm or mid-ribs is midway, i. e., is on our transverse plane. It forms an arched partition between the abdominal and thoracic cavities. To the front fibrous, the back part of it towards the spine is muscular, so that when this part shortens by contracting, the diaphragm is gathered down. But since the diaphragm's muscle is of the involuntary order, its contraction is a part of the organic life; is therefore beyond our direct control. It is, then, incorrect to say "diaphragmatic" breathing. But if one expands the abdomen, which is done through the voluntary muscles of the abdomen and lower thorax, one may make the downward excursion of the diaphragm greater. That puts us on the track of the proper term, which is, "abdominal" respiration.

To go on then with the full breath. Begin by "blowing up" the abdomen. A good method is to lay the hands on the abdomen and make them rise to the extreme limit. The diaphragm plainly gives a sensation of descending. *In this part of the act the chest above the imaginary plane is to remain completely at rest.* Now having done the first half properly and to completeness, get set, heave the chest from below and continue the drawing up quite to the chin, but without strain. The abdomen will follow, i.e., will become depressed, but as the diaphragm has been fixed, no air has escaped if proper care were taken.

It is surprising how very much more air is taken in in this way, than by ordinary respiration. The proof is, the very much prolonged expiration, which should be simply a matter of steady relaxation. It will be found too that a demand for another breath is not felt all at once, so that a natural and perfectly tranquil pause develops between breaths. A farther result is, that the rate of respiration immediately becomes slow. Three to four respirations will occupy a full minute without the slightest holding back or pause at the top and with entire comfort.

In such a systematic full breath, a much greater share of the capacity is delegated to the lower chest and abdomen;—only the relatively smaller end of the contract is left to the upper chest (which is quite the reverse of average breathing). This is in accordance with the fact that the lung fills from below upward—the very apex of the lung is the last to expand.

Expiration is lengthened rather more than inspiration. With this lengthened respiration the sense of *bien aise* is very marked. Practising the full breath is of great benefit and is to be strongly recommended. When retiring, is of course a good time, but it can be practised at any time. As said before, there can be only an imperfect performance in the upright position, but even that *minus* is not to be discouraged. The effects are first of all as a tranquillizer. A sense of calm settles over one; the circulation is remarkably equalized—the much wider movement of the dia-

phragm undoubtedly lowers the position of the heart and relieves the great vessels; the Aspiration of the Thorax is at work; and finally the up and down movement of the abdominal organs must play its part. At all events the full breath, in our experience, contributes very much more to real exercise, as respects influence on the system, than does a lot of muscle activity.

After the full breathing the pulse is slowed down; and our observation is that some daily attention to the full breath as explained, results in a much calmer heart and an habitually slower rate of respiration.

It will be observed that we have not had much to say about oxygen. One does not take a full breath so much for the purpose of getting in extra oxygen as to influence the circulation (*cf.* Aspiration of the Thorax, Chap. 5). The blood can take up oxygen only to the point of saturation. Provided the oxygen is in the atmosphere (pure air), we believe that, in a state of moderate exertion, ordinary breathing will account for the oxygen end of the system's needs.

Breathing with only the lower half of the respiratory apparatus, if complete, suffices for comfortable respiration and may be thus practised. For the time being it is not at all necessary to bring into play the upper part of the mechanism. If the full breath be well carried through one comes to get the sensation of a rotary action, downward in the rear, in front upward.

As respects the everyday practice of mankind we

might classify individuals into either chest or abdominal breathers (not to overlook the unconscious moderate play of the diaphragm in the case of all). Very few are both. The majority are chest breathers. Women are upper chest breathers as a rule. For them the profit of the full breath ought to be very great. Thus, in most cases there is no general, well equalized, well sustained expansion of the chest.

For a constant habit one's endeavour ought to look to a rhythmical *modus operandi* which shall embrace both the abdomen and the chest divisions. After proper training in the full breath and in the chest movements of this book, it costs but little thought to secure the proper rhythm and an increased use of both the abdominal and the chest divisions. Made conscious of the act, a very small message to the abdomen first—and then to the chest wall, suffices to establish the rhythm. The start, however, must be from below and first of all the pit of the stomach be felt to bulge.

CHAPTER FIVE

ASPIRATION OF THE THORAX

IN the previous chapter we brought the act of respiration up to the point of the filling of the lungs with air. But the thorax imprisons something else than lungs, viz., the heart, the great pump and reservoir; and the connecting conduits—the great arteries and veins.

In describing the act of inspiration as the lifting and expansion of the thorax we touched incidentally upon the further function that the expansion performs, by referring to the fact that, when the air pours in, in response to atmospheric pressure, the fluids of the body do, too.

It is then, as if the thorax were, Atlas-like, supporting the atmosphere, and thereby relieving the interior, of the burden of that same pressure. The result is a slight though temporary negative pressure that might be described as a tendency to a vacuum. Nature of course will not tolerate this; physical laws become operative; the pressure within and without will immediately equalize; but the resultant is to start a move towards the thorax as a center. If air pours in, fluids do also.

The atmospheric pressure on the surface of the body remains constant while that within the thorax is diminished and wants to diminish further. The plus pressure on the surface becomes then a positive force to accelerate the movements of fluids towards the chest. To put the matter in another way, the adjustment of pressure is equivalent to a suction action on the part of the thorax. The greater the expansion of the thorax, the greater the negative pressure and by consequence the greater the suction.

We might illustrate by the case of an institution with which we were connected. The temperature in one of the outlying wards could not be maintained; little steam reached there because there was not power enough and the steam had a chance to condense. To make matters right it was necessary to rig a donkey engine to suck the water (condensed steam) back to the engine room.

Aspiration is the donkey engine. The heart, the engine. Inspiration means then the breath into—Expiration, the breath out of—and *Aspiration, the fluids towards*: the chest.

The function of Aspiration is a piece of physiology that is seldom referred to, being left to repose calmly in musty physiological text books. But in our observation hardly is any conscious act in life so important. It furnishes one of the readiest means of controlling the circulation.

The heart's action, that of a pump, starts the blood

on its course. The elasticity of the arteries, in their recoil from the stretching that the first surge of the blood gives them, continues the journey. When the capillaries, those minute and microscopic channels permeating, as with a mesh, all muscles and organs of the body, are reached, this *vis a tergo*, viz., the forcing power of the heart and arteries, begins to wane and rapidly declines to near nothing. The result would be stagnation of the blood in the capillaries unless some other force were at hand to prevent it. That force is, the suction action of the thorax to which the term Aspiration is given. As above described, this suction fills first the heart and larger veins—an onward motion being thus transmitted backwards to the blood in the smaller veins and venous capillaries. These communicating with the arterial, the engorgement in any given district or organ is relieved.

Thus the body is one vast aggregation of what might be called units of circulation. A unit consists of capillaries (the smallest blood channels, to be recognized only by the microscope) both arterial and venous—these communicating with the smallest constituted tube, arterial or venous—these in turn connecting with larger arteries and veins. Capillaries are enmeshed in the tissues both of organs and muscle and their circulation connects with whatever ooze or silt there is from the cells.

As to its constituents and mechanism, the unit remains the same whether in the great toe or the wall

of the heart. Distance doesn't count. In respect to the get-there and get-away of the blood, the wall of the heart is as far away, i. e., as much of an extremity, as the great toe. The circulation in the units will be subject to the same laws and require the same working out in either case. Therefore the Aspiration of the Thorax is of equal importance to the wall of the heart or to the center of the liver or to the great toe. The surface circulation likewise is governed by the same forces.

The movements of fluids in the body is known best through the study of the fixed channels. Yet undoubtedly there is one continuous seepage in all the soft tissues and organs. Thus there has been recently announced a lateral circulation in the skin quite apart from the regular well-recognized channels.

Thus breathing puts at man's disposal an artifice for completing the cyclosis of the blood, for helping it in no small way to reach the point from which it started. This is one of the most practicable things of life and puts a powerful lever at our command. The author's idea of exercise is that this power should be raised to the highest dimension. Hence, his effort to lay stress on increasing the heave of the chest muscles, to emphasize their control and to condemn all derogatory influences that tend to annul this function or consign it to abeyance. Increase of this aspiratory power in the chest is the great gain that follows any widening in the respiratory excursion. We have made further

remarks on this in the chapter on the Full Breath (4).

The influence of Aspiration may be illustrated in a number of ways. Thus, very rapid respiration, at the same time full, will produce so much confusion in the brain circulation that a sense of dizziness and syncope is produced, during which it is said a tooth may be extracted. It is in keeping warm, however, that one finds the most convincing evidence of the power of Aspiration.

Cold is a sensation caused by the blood becoming stagnant, thus cooling and not protecting the sensitive nerves. Select a sharp Winter morning, fetch some rapid breaths, short and quick interspersed with deeper ones, and with practice and chest power one may readily notice that the sensation of cold is modified. The suction from the chest has started the cold blood along, warm blood takes its place and the tingling nerves are comforted.

Again and even more pointedly one may find an illustration in Nature's adoption of her own process to make us readjust a system gone wrong. What is a sigh? Nothing but a full breath and a very full one at that. In the case of a person depressed or given over to gloomy thoughts the heart's action slackens and the respiration becomes feebler. Between the two influences the circulation becomes sluggish. This may go on for a time but presently Nature steps in to interfere, slaps us on the back and admonishes us: "Here! no more of that—sigh!" One takes the full breath, the

expanded thorax does its Aspiration and the situation is, at least momentarily, relieved. So with a gape: originating in another way of course, it is a very full and most satisfying breath with consequent Aspiration. When is gaping and stretching (another manoeuvre to increase the thorax's capacity) most the order of the day? In the morning, when the repose of the night has dulled all the activities of the organic life and loaded all the organs.

CHAPTER SIX

THE CHEST

ACCORDING to our way of thinking the chest (thorax) plays a very important part in true exercise through its control of the circulation (Aspiration). A good idea of its structure then will serve as a useful peg on which to hang up some of our other observations.

We once took a woman who had graduated from a pretentious physical culture school—a three-years-and-a-diploma-affair, and taught her our movements. Her observation was that, for the first time, she was “conscious of her chest”: to be considered a high compliment. It is a pertinent expression. It has nothing to do with “chesty”. It means to be able mentally to analyze the chest into its component parts, to realize its play, and through the medium of the muscles to have secured a grip on each and every part.

Muscle can always perform a double function, according to which end is fixed. Thus the biceps, we say, originates above, and is inserted below, the elbow joint. For the most part, when it shortens it bends the forearm on the arm; but fix the forearm and hand, and it can draw upon the arm and body.

So of the muscles arising from the chest; many of

them are inserted outside, as into the arm, or even, through interlocking with the neck muscles, and through the interposition of the collar bone, might be said to connect with the skull. One may either pull the arm to the side or if the arm be relatively fixed, use its movements to strain at the chest; one may draw the head to the chest or, fixing the head, use the same muscles to tug at the chest.

Action of a chest muscle is of much greater importance than action of a muscle of the extremity. The last is a muscular action pure and simple; but the chest has contents, the supremely important *viscera* of organic life, and the motions of the chest must ever be looked at in this relation. The chest is hung and hinged upon the back-bone. Thus the back-bone of man is equally the backbone of exercise.

These considerations give a hint for the principles to be adopted in setting-up and in exercise. The chest must be raised and otherwise played upon by the leverage from without, i. e., from the head and arms. Some of the author's chest movements, for example, are mere amplifications of ordinary stretching. This action is Nature's way of expanding the chest in order to obtain a good breath and a good Aspiration, when needed.

If one reflects upon the act of stretching one cannot but be impressed with its deliberateness. So in chest movements there should be the greatest steadiness and uninterrupted *crescendo*. If one puts consciousness into

the movements one may, it is true, go as far as a final strain of the muscles, but at the acme, immediate relaxation should follow. Thus a full breath never should be held. To do so is to continue the strain after the maximum of force is attained. One might in time easily damage the elasticity of the lungs—to the great detriment of the respiratory force. It is important to note that the overcoming of the elasticity of the lungs by the atmospheric pressure is the last item in the full breath—an argument for deliberateness and completeness in breathing.

The expansion of the thorax from without, constitutes the act of breathing. This may very readily be observed. Do movement No. 6 or No. 7: the leverage of the arms causes a maximum of thorax expansion. No thought is given to taking a breath, but the movement will, on resuming, be found to be followed by a prolonged expiration.

The mobility of the chest depends to a very important degree upon the *costal cartilages*. These are elastic gristly prolongations of the ribs—inserts of various lengths between the ends of the bony ribs and the breast bone. The play of these elastic structures is, in good part, the play of the chest. Unfortunately they do not possess a high degree of vitality; in consequence they are subject to a deposition of lime salts, i. e., tend to turn to bone. It is not difficult to see from the author's point of view how supremely important the preservation of this

elasticity is. No chest with ossified cartilages can be properly expanded. There can be neither good respiration nor Aspiration—the keystone of the arch of exercise has fallen out. Rarely do we see this full elasticity preserved later in life, say at three score. To say that a man is as old as his costal cartilages is even more comprehensive than to say “as old as his arteries.” Our belief is that the degeneration of the costal cartilage develops first. A flexible chest is the Master Key to health.

The prescription for preserving this elasticity of the costal cartilages is, first of all, use of them. Pay attention, as we so often direct, to the rise and fall of the chest. Learn to know and be able to control wilfully the muscles that accomplish this. Since the costal cartilages might be looked upon as component parts of the breast bone rather than of the ribs, the muscles to bring especially into focus are those covering these first two structures, and including the muscles of the neck.

The other means of securing the vitality of the cartilage must be the upkeep of a good general circulation. The cartilages, like the arteries, are structures of low grade vitality and will be the first to respond to that cellular degeneration which a bad interchange of blood induces. There can be no doubt that the mere movement of the cartilages is a help also in preserving their vitality.

THE END

CHAPTER SEVEN

GAMES AND SPORTS

THE connection between recreation and exercise is of the greatest importance. The altogether too common view of recreation is that which burdens it with the duty of furnishing the maximum of muscular activity. That view is something of a squint. The first function of recreation—its solemn duty so to speak—is to supply exhilaration.

The right point of view can be fixed only by orienting one's self in respect to the nervous system—by facing due North and boxing its compass. Even the coarse distinctions in the nervous system seem rarely to be emphasized and even more seldom given due proportions in respect to influence.

Nerves are not just nerves, as like as milk. There is the central system, the larger controlling stations in the brain and spinal cord. But beyond this, we are denied the knowledge of where is located, and of the avenue that leads up to, the seat of that supreme controller, the mind. And then we have the motor system, the field equipment, the wires strung along to outlying districts where muscles stand and serve in response to the messages of command.

But next to that supreme and mysterious guide, the mind, perhaps the sympathetic system of nerves is clothed with the nearest to plenary powers. Plenary is a designation that fits accurately the sympathetic system, because this is that part of man's nerve equipment that does precisely *full* or round out our life.

The construction of the word furnishes a most consistent proof of this. The "sym" is "*sun*"—together—and "pathetic" is "*pathos*", the state or susceptibility. So that the sympathetic is the binder-together of all our various organs and functions; that is to say, the sympathetic system is responsible for the interplay of organic life and of the emotions. This much we know of it anatomically, but back of all is that final supreme question *quis custodiet custodes*—who shall keep an eye to the watchmen—that ever haunting question, ever pressing home to us the mystery of life.

If one inquires into the functions of the sympathetic one will find any amount of *data* that has a bearing upon our theme of exercise. We have said that the sympathetic is at once the organ of the emotions and of the organic life. This explains why, under some influences, the heart beats faster or the breathing comes in pants; or why, if terrorized or anxious, the heart is in the mouth and one feels a sinking at the pit of the stomach.

In considering the sympathetic as the seat and transmitter of a great variety of emotions, running the gamut from fear to a giggle, one must not leave out

of account the higher law of its control. In some senses the mind is antagonistic to the sympathetic. There can be no question that the mind is strengthened by inhibition, which is another way of saying, putting a curb on the sympathetic—that intellectuality has a sobering effect—that large exhibitions of emotionalism often betray an organization off its guard.

Take giggling: it may be that the person is “ticklish”. Being ticklish to a marked degree implies an entire lack of control, which is hysteria. If the ticklish person can, through an imperious will, summon a certain composed state of nerves, or what is the same, a state of mind, then that person is no longer ticklish but can resist.

We now get a view of what one should seek most to emphasize in connection with a game. From the point of view of exercising, a game is any form of energizing that introduces a proper degree of stimulation of the sympathetic. The measure of this stimulation is exhilaration—a display of high spirits—a sense of satisfaction. One feels exhilaration only when the skin capillaries are flushed—emotions of the pleasureable class are always accompanied by this phenomenon to a greater or less degree. That is because the vasomotor nerves, which control the size of the capillaries, permitting their dilatation or compelling their shrinking, are part and parcel of the sympathetic system. This can be strikingly illustrated by the blush.

The blush is, to the eye, a dilatation of the capillaries

in the skin of the face—though properly speaking it is more general, as when one feels a hot flush all over. In proper recreation (and exercise as well) one might be said to be a-blushing all over. The dilatation of the surface capillaries means so much turning aside of the blood from internal ways. It represents a widening of the surface channels, an opening of sluices, and in that sense is a sort of safety valve. The person that can blush betrays a susceptible and impressionable sympathetic system.

It is not desirable that this should be too much the case. Within bounds, however, it is not only normal but worth while. The possessor of such a system is likely to respond to the quickening power of a game. But the over-developed in this respect will be exposed to a danger of his own creation, viz., the risk of displaying over-anxiety. As we have said in other parts of the book, this element, which goes back to temperament, ought to be carefully watched. It accounts for some of the demoralizing effects of addiction to a sport.

The item of exhilaration ought to be of paramount consideration in right exercise. It is the final factor in the application of our test of exercise, viz., the circulation. If one starts out with the primary intention of first getting the exhilaration and under cover of this securing the proper modicum of muscular energizing combined with free chest action, here is exercise in its most royal habiliments.

Many forms of so-called exercise are entirely lacking in this element. Is not the man religiously doing some muscle stunt from a mistaken sense of duty, in reality perhaps offering sacrifice to a graven image? In the last analysis he convicts himself of taking the matter of applied exercise too seriously. He sees practical exercise looming up as a conception of the most definite proportions. But exercise, as we try to emphasize, is just man's wilful contribution to that marvellous complex, the human economy. Any too precise formulation then of exercise in the concrete, is not in accord with the terms of the problem.

Just as some things done for exercise can be actually depressing, so a game may, in the end, undo all its constructive side. A game of golf, e. g., can be fatal to the disposition. What does the balance sheet say then? On the debit side we have recorded, depression of spirits and its kindred, disgust. In place of the liberation of the circulation, this is penning it up.

We have described the blush. The opposite is blanching. There are those that do not blush under excitement or emotion. Far better to blush than to blanch. Blanching implies suppressed emotion or at least, the emotion not given proper outlet.

Herein is why our definition of exercise may be said to embrace a hearty laugh—even a good cry is better than to run up the black flag of melancholia. Atrabilious is another way of saying carking care and a shackled circulation. In such a case there is need

of a safety valve and this the sympathetic supplies.

A hearty laugh is exercise because it affects the circulation favorably. It does this through the vaso-motor nerves, branches of the sympathetic; these vaso-motor nerves control the capillary channels; through their influence a hearty laugh flushes.

How now is it with sports? They may be truly games, but they are often anything but that. "For the game's sake" is apt to mean playing only to win. The place of exhilaration is taken by excitement: the participant taken captive by an obsession. What can be so exciting, so frenzical as an illusion! But persons possessed by an illusion are often insane. And in good truth, sport obsession may be a kind of insanity. For one thing it often blinds its devotees to all consideration of the good derived from, or the principles of, exercise.

Take football by way of illustration. The manner in which it has been legislated from the status of a game to that of a sport in the last thirty years, marks so many milestones of evil. The edifice was already there—a fine game that would, however, not stand too much systematizing. But along comes training, paid coaches, popularization, undue publicity, spectacularity. Each coach must make good—ring the changes. The result was, programme not effect. A huge scaffolding was erected, but nothing added to the edifice. The player still muffed the ball! Undue pains taken with a worthy but simple object, incapable of too much

amplification! The game was crushed out. It fared worse than a player with his breath knocked out. *Paraphernalia* in abundance but where is the dowry (*pherne*)?

Some reform measures have been taken, and let it be noted that everything that has counted has been in the nature of a step backward toward the *game* of football. A game always develops the personal self-direction, the individual initiative. Here is no hide-bound allegiance to a hated machine. Hence, in the performance the element of surprise, the dazzling feat that has its origin in a spontaneous and instinctive suggestion. The old football squads, under the training of their captains, accepted their trust and returned it what it was—a game. When the training table was set—Good Night!

The *gaudium certaminis* is a real exhilarant, far different from the anxiety of being consumed by a desire to win. In this case there is only confusion and disturbance of the sympathetic. A real game does not readily reduce to the terms of a spectacle. The sight of bystanders becomes an evil. The right spirit of a game is not to care too seriously about winning but to play it more for the fun of the thing—with winning in the background. To “beat the other fellow” is often far from winning.

CHAPTER EIGHT

POISE AND SET-UP

Poise goes back to the erect position as distinguishing man from the quadrupeds. *Set-up* is something added to this through the contraction of certain groups of muscles. *Carriage* implies that we have something to carry and are aware of it. *Well-knit* has reference to the adjustment of bones, the firmness or slackness of connecting ligaments, the tone of muscle.

Of this arch, set-up is the keystone, inasmuch as it superimposes something upon the others. That something is the voluntary action and control of muscles. It follows then that there is something very orderly and rhythmical about a set-up. It cannot consist in a violent slatting about of the body, tornado-like; as if consistently over-shooting the mark were better than a miss. These remarks are directed particularly against the setting-up drills that involve a maximum of effort and a minimum of control. A real set-up drill consists in a supervision by the will over the contraction of various groups of muscles and the directing of the parts into the proper places and relations. For a set-up, an individual is not conscious of the body as a whole, but of its component parts. Therefore setting-

up can never be other than steady, with the knowledge of what one is trying to accomplish and attention to certain fine adjustments.

Poise takes into account the distinctive mark of man, viz., the erect position. The skeleton by itself is comparable to a flail—bones separated by joints and joined by ligaments, as the flail is by a leather thong. Trying to keep the skeleton erect would be rewarded much as the attempt to stand a flail upright. We need the superimposed muscles, which by their contraction (either wilful shortening or natural tone) overcome the tendency of the skeleton to collapse.

Specifically, the erect position is preserved through the action of the powerful pair of muscles placed longitudinally on either side of the spine. (See Fig. 36). These are called the *erectores spinae* or the “stiffeners of the spine.” Man in the erect position, starting to walk, has a tendency to fall forward. However firmly he may be planted on the ground by gravity, his body will follow his feet as he moves forward his center of gravity. This instability is resisted by the action of the above muscles, each of which may be felt (in the small of the back) to make a sharp contraction, alternately with each other, and also in alternation with the stride: thus, right foot forward, left muscle contracting.

Poise, then, comes back to these muscles and through them to the ground as a *point d'appui*. Poise and set-up as well, must, for support, be hung upon

this post, viz., the spine kept rigid by these muscles.

In a well-knit figure, ligaments and muscles of good tone play the chief part. Ligaments are the very firm fibrous structures covering joints and connecting bones. The tone of ligaments can be added to only by indirect means; but it is plain that they may be weakened and rendered flaccid by violent use of the limbs and muscles. Abuse of muscular power must surely result in the enormous tenacity of the ligaments being overcome. Thus a preponderance of muscularity can in reality un-knit the figure.

Loose-jointed persons have relaxed ligaments and the condition of loosed-joints can be actually produced by specially directed muscular exertion. There are gymnasts that become expert in the dislocation of the large joints; so that the head of the thigh bone (a ball and socket joint) can actually be forced out at will.

Another illustration of ligaments losing tone is in the condition of flat foot. The arch of the foot is primarily constituted by ligaments binding together the bones, which are buttressed in an arch-like formation. The falling of the arch reverts back for its primary initiative to the relaxation of these ligaments.

Ligaments, as in the case of other important structures (arteries and cartilage) show apparently a certain minimum of vitality. These structures have very little blood supply and in consequence are subject to easy degeneration and loss of tone.

Ask a man to stand up or to straighten up and the

chances are that he will first bend back, or perhaps that is all he will do. On the contrary, bending forward is item number one in the set-up. Only last of all do we come back to our contracting back muscles. Their tendency is to pull us down to the ground (as the *point d'appui*). But we must first of all pull up and this is done with the muscles in front.

To comprehend a natural set-up we need in the first place to get into the contrary position, i.e., the round-shouldered. Lean the body forward of the hips; let the chest collapse, the shoulders rotate round and forward, the arms hang flaccid with the inner edge of the hand turned forward (Fig. 31). From this posture straighten up the body, commencing from the front. The abdomen is to get the first attention, then the chest muscles begin to heave, then the neck muscles to tighten, finally the head is drawn up and quite a little backwards. All this is done in front. Nothing should have happened to the shoulders or to the back. The body still inclines somewhat forward. (Fig. 32).

After the upper chest and head are pulled back and up to their highest level (Fig. 33), the stiff arms (one-piece-arm) and shoulders are to be rolled backward round the chest to the extreme limit so that the thumb looks out, the palm to the front (Fig. 34). Now enters in the final series of contractions: the back of the neck first, with a firming up of the back muscles and so on down to the heels (Fig. 35). This set-up involves a number of the author's movements

for exercise and the points will be further elaborated there.

The human body can never by natural means be better adjusted than this formula makes it. Our human frame is trued up by a twist and a turn in just the right quarters. (Follow with Figure 35). The muscles of the abdominal wall are tightened just to the vertical—the abdomen is neither concave nor bulgy. The chest is full and flared out. The head is high and the neck taut—the hollow of the shoulder well done for. The shoulder and arm are rotated round the body, which is forward. Collar bone and upper arm point backward. Finally the back is perfectly flat, the shoulder blade on the dead level. (See Fig. 36).

Such a set-up is entirely different from the common injunction, chin in, chest out, abdomen in! This is posturing or striking an attitude. It results usually in a “pouter-pigeon” chest and a retracted abdomen. Either one of these postures is unnatural and if maintained can only result in rigidity where there should be play, and in undeniable interference with the rhythmical rise and fall of the chest. In a good carriage, chests should never be deliberately and extravagantly held up—they should hold themselves up—through the tone of their muscular apparatus—reinforced by a little wilful contraction. This tone, while unconscious, is first to be secured and intensified by conscious and orderly use of the muscles.

One notices a great tendency to hold the abdomen in. The abdomen has a right not to be concaved. A good abdomen has a front wall that is vertical. The muscles that keep it so are rightly called *recti*, "straight." To draw the abdomen in is to take it up into the thorax, the cavity of which is thus encroached upon and the action of the diaphragm interfered with. There is, we must remember, no waist line in front—the waist commences at the sides and extends into the back.

The exaggerated "pouter-pigeon" chest is seen in those trying for greater chest expansion. This succeeds in proportion to the skill acquired with the art of taking the abdomen up into the thorax, and with this counter-resistance, forcing out the ribs during inspiration. Exaggerated chest expansion is thus a mere trick and is of relatively little value.

The set-up muscles then, easily divide into groups, and a good set-up turns upon the contraction of these groups in a rhythmical order. First group: abdominal from hip bone to lower ribs. Second group: from upper ribs, particularly the fifth, to collar bone. Third: straight and oblique of neck from collar bone to chin and mastoid process (back of ear). Fourth: back of neck from head to upper ribs and shoulder blades. Fifth: from (in back) upper ribs and shoulders down to heel. This is both the grouping and the order of contraction for producing a rhythmical set-up.

Reduced to its lowest terms we may say that the

set-up mechanism can be viewed as two elastic straps: one from the pubic bone to the back of the head—the other from the back of the head to the heels; one pulls up, the other down. The neck is very important in set-up because it makes a connecting link between front and back muscles; a wobbly neck is fatal: a short neck is an advantage, but a long neck may be also firm.

The back of the head is of more importance in the high chest than even the chest itself, because the collar bone must first be raised before the chest is and this is accomplished by the muscles of the neck which take their origin in the skull. Therefore a high head and a firm neck is the key.

Of course set-up movements must be taken when standing. That emphasizes the importance of much standing, to preserve a good carriage. Sitting down is a worse sort of relaxation than lying down because it usually means a more complete withdrawal of support and a greater slump.

The body is like an accordion, capable of shortening and lengthening. There are two important curves in the spine, that which makes the hollow of the neck, and the curve of the lumbar region. The moment these curves increase, that moment the person grows shorter, and permanently so if the changes are permanent. The accordion commences to shut up.

Poise has undoubtedly great influence over the displacement of the internal viscera, of which much is heard under the medical name of ptosis. Ptosis is a

sagging or a falling, and is of course the product of many causes, of which bad carriage or lack of poise is only one. Nevertheless if persons accustomed themselves to such a setting-up as is outlined in this book and would not only stand much but in standing keep really erect with taut muscles, there ought to be but little ptosis. The spoon-handle body—concave chest and convex abdomen—can only be corrected by teaching the chest to hold high and the abdominal muscles to hold straight.

The sagging abdomen depends in part upon the feeble pull of the thorax but more on the loss in the development and tone of the abdominal muscles themselves. It is loss of tone more especially that permits the abdomen to sag. A low station of the diaphragm doubtless has much to do with forcing abdominal organs down and keeping the abdomen full. The correction of this would consist in the practice of the full breath with ample time in the interval for the diaphragm to ascend to its highest position. The well-knit, well-toned figure is the antagonist of ptosis.

CHAPTER NINE

ROUND SHOULDERS

ROUND shoulders are the precise opposite of a good set-up. In describing this we outlined an assumed posture to be taken at the start. This posture would answer for the description of round shoulders.

Anatomically the shoulder means something quite different than in ordinary parlance. What is commonly called the shoulder is only the tip of the shoulder, precisely as the Greek name denotes, viz., the *acromion*, or the *point* of the blade. The shoulder as we shall speak of it, includes the whole blade, the head of the arm bone (*humerus*) and the collar bone.

The shoulder blade rides on the posterior portions of the upper ribs, tied down to them by intervening short-fibred muscles. If the blade is to lie flat, two factors must be at work.

The thorax is not a fixed cage. The ribs have some jointure, hence pliability—the costal cartilages, great flexibility. If the collar bone be raised and the breast bone and costal cartilages made more convex, the ribs behind must follow and become flatter.

The second factor in the flat blade is the tone of the underlying muscles. Note that it is not possible to

bring these into play by conscious action but apparently only by indirect means or as a part of complicated voluntary movements.

' Coming now to the arm we find the head of it inserted into a very hollow socket in the shoulder blade. It is kept there by the tension of the ligaments and the tone of the over-lying muscle.

The complex of round shoulders then, runs as follows: the front of the chest, including the collar bone, the breast bone, the costal cartilages and anterior ends of ribs, we will suppose not to be well acted upon by the muscles (of set-up and voluntary respiration). Neglected, it tends to collapse. The ribs behind develop a corresponding convexity. The muscles tying the shoulder blade to the back lose tone and become slackened. The shoulder blade first becomes loosened. But because the ribs have become more convex, it tends to glide round farther to the side and front. The inner vertical edge of the blade instead of being over near the spine becomes farther and farther removed and more or less everted so that it becomes prominent (angel wings).

This pull round and forward is in good part due to the weight of the arm, which has assumed a new position. The ligaments and the muscles over the head of the arm bone having lost their tone, the arm becomes loosened in its socket and rotates, so that the back of the hand turns to the front. Thus we find the arm and shoulder tip ever tending to assume

a position in advance of the chest, which seems all the time to be retreating. From the front the chest appears very hollow, particularly just to the inside of the arm; the shoulder smothers the chest.

The cure for round shoulders is to pay attention to the items in the reverse order, i. e., to double on the track of the formation. In the first place the front of the chest must be tugged up and forward and held there. Since the thorax is a closed cage (though happily not a fixed one) this automatically flattens the ribs behind. The blade tends to snuggle down. After this, but only then, the arm must be rotated in the socket by the posterior muscles of the shoulder.

These are the steps to be taken in restoring the relation of the *bones*. But a complete reversal of form requires that the *tone* of the *muscles* shall be renewed so that having gotten the parts anatomically adjusted, they may hold in place. All the chest movements offered in this book, work in this direction. Particular attention must be paid to controlling and strengthening the posterior rotators at the back of the shoulder.

A little attention to this description of forces at work in production of round shoulders, ought to make it plain that they are just the opposite of the author's set-up, and that while round shoulders are shoulders turned outside in, the set-up will turn round shoulders inside out. The careful practice of this set-up offers a guarantee of a flat back and well rotated shoulders—in short the antipodes of round shoulders.

CHAPTER TEN

THE BEST EXERCISE

ONE gets a bit tired by the constant statement that such and such is the best exercise because it involves all the muscles, or *per contra*, that "an exercise" is not so good because not so symmetrical. Thus we may quote from the book of a professional teacher: "But this (walking) is very defective, in that it calls only the leg muscles into vigorous action leaving four other great classes of muscles for the most part unused."

To our mind, this sort of talk, so often reiterated, is even nonsensical because it begs the main question of the nature of exercise; what its terms and conditions are—in other words what one is seeking when one takes exercise. In speech the very confusion between exercises (bodily movements) and exercise leaves no doubt that the main question is glossed over. One cannot really speak of the best exercise but of the *best way to take exercise*.

As we have urged with constancy in this book, it is in the circulation, that exercise finds its best measure. The manner in which the circulation reacts to any chosen means is considerable of a criterion.

One cannot take exercise without some use of the

muscles, but in any case the muscles of the body are of much more importance than those of the extremities. And if we come back to the idea of many that the only real exercise is, to use the boy's expression, "knocking the stuffing out of himself"—then we must protest that this is work—often done, as daily work can never be done, under great stress and with extreme condensation.

With no intention of preaching the gospel of laziness—from the point of view of this book, it is entirely pertinent to inquire whether hard, daily, manual labor, with an output of energy that can be measured in terms of work, viz., footpds., whether such labor is actually wearing—that is, can the waste be repaired?—in other words would a person live longer if not obliged to labor in this way and what should the substitute be?

As regards the question raised, while it can only be simply a matter of opinion, we hold to the view that hard work shows a plus of destruction, i. e., is a cross, and that a healthy organic life, one that easily defends itself from the inroads of disease and from decadence, can be properly supported and renewed by very moderate energizing, well directed and founded on principles.

Even more wearing than daily toil though, must be that sublimated work that men submit themselves to under the name of exercise. It may be anything from a treadmill to tennis; but in any case the quickly obtained exhaustion of forces is not in any sense the steadily-maintained, never-urgent, balanced activity of

daily labor. After tennis, men may claim they feel like fighting-cocks—but they often look far otherwise.

An exercise-programme of muscular energizing to the point of work, condemns itself almost, as shown by the fact that it is never followed up consistently. There seems to be a sort of instinct with us, that forbids us to persist with it. How admirable and distinguished would be the spirit of the man that would jump into a treadmill every day of his life and do a regular stunt of work at it! And then *cui bono?* Everybody that we have ever observed, daily throwing off with splendid grit a set piece of exacting muscle work, has come out at the little end of the horn. Or its devotees, through sheer tedium, become deserters.

For the man that does considerable bodily work, there is no more work to be done: with muscle—for him exercise lies along quite different lines. But the man that doesn't work needs not to rush excitedly and perform some laborious stunt misnamed exercise. Even for him *exercise is the sum of small energizings*. He is not to be lazy, slothful or lethargic. What is comprised under chores, gardening, housework, setting-up drill, walking, sports and games, waiting on one's self, to specify a few among the many items, constitutes a good battery. In such a programme there is salvation and defiance of old age. In any case one must not forget the alertness of the mind which, in the maintenance of the organic life, is of quite as much importance as any muscular activity.

The best exercise, from the standpoint of this book, is *that activity which supplies freedom and the open chest in conjunction with exhilaration and a sense of satisfaction.*

The bicycle is an example of exercise turned into work, and of wrong features as well. If the bicycle were used for a quiet slipping out a few miles into the country to a rest under the trees, well and good. But to do the opposite—reel off “centuries” etc., is a capital illustration of what exercise should not be. It is work sure enough: but the constrained position, bent-over chest, smothered by arms and shoulders, often closed-glottis, are a sufficient guarantee that there will be no proper breathing and that the heart’s action will be decidedly interfered with.

In its heyday the bicycle produced many a beautiful calf and many a damaged heart and circulation—take your choice!

Here again one is at the parting of the ways as to what constitutes exercise. Golf has been derided as the old man’s game—“old enough to play golf.” What’s the key to that attitude?—golf’s lack of *strenuosity*! which in turn gives us the clue to the everyday view of exercise. But, after golfing many-a-day for about twenty years, we shall not strike our colors to any such hostility as that. It rests upon a mistaken conception of exercise.

Even as a game, golf will furnish such an ample sufficiency of exertion as will fill out the demand of

the human economy. In the case of a younger man, in addition to playing the game, let him practise! This serves the end both of exercise and of the improvement of his game. By a repetition, reasonably quick, of the golfing swing, one can pile up exercise fast enough, though not much muscle perhaps, with plenty of fatigue and a fine outbreak of sweat. Now note the difference between this and dumb-bells or pulling weights. In the golf swing we come to a state of relaxation between acts; both the chest and the whole economy return to the *status quo*. There is an interval of repose. In the others, indeed in any form of exercise with resistance, we are uninterruptedly set—the chest is fixed—it is an obstacle programme (*cf.* Chapter 2). This is not necessarily fatal to real exercise but it must be watched.

In energizing, the sense of effort has to be reckoned with and the quality of temperament taken into account. The effort that throws one into a violent perspiration will leave another calm and undisturbed. The difference is the product of anxiety and the nervous system—in a word self-consciousness. From this point of view some persons will have done as much in half an hour as others in an hour. They should know it or be told it. Tennis furnishes much of this order. The stretchy over-head serving is a fine piece of exercise, but in the volleying much *qui vive* and much holding of the breath is necessary. It does the heart up easily—especially in the case of the nervous temperament.

The *game* that best fulfils our conditions of exercise is golf. The full golfing swing is about as complete exercise as we know. When the chest is once raised one gets generous respiration whether he knows it or not. Attention is on the movement, but air rushes in: one likewise gets the Aspiration. Then there are the various other movements of walking, stooping, twisting the abdomen, etc. Golf well persisted in will surely take off and keep off abdomen, and put on chest.

There is swimming, quite analogous. But we refer to the long, steady stroke, with the reach—here the chest movement is of the same elevated high-expansion type. Swimming on the back is better still, with good push and over-head reach. In both these varieties of stroke, it is scarcely possible to interfere with the mechanism of full and free breathing. Especially in the back position, if properly executed, the thrown back head, taut neck and chest well tugged at, against the counter-resistance of the push, offer an unsurpassable combination. Many forms of taking exercise are subject to the impeachment of heart strain, as explained in the chapter on Muscle and Circulation and as hinted at in various other parts of the book.

Skating serves the ends of exercise most admirably because of the splendid swing of shoulders and their action as levers on the chest. The circulation is never better equalized. Yet skating never would produce big muscles. (*cf.* Chapter 16, Walking, and remarks on use of shoulders).

Canoe paddling, in a recreative way, furnishes excellent exercise, because in raising the arm while sitting upright, we get increased respiration and Aspiration, especially if the cadence of the stroke be moderate.

In hard rowing, on the contrary, the chest is set, as previously explained, the position constrained, the breathing intermittent. There cannot help but be a strain on the heart. Second wind and good wind in general depend upon the readjustment of the (R) heart to increased demands—or its acquired ability to deal with the overwhelming mass of blood thrown back upon it. (*cf.* Chapter 2). For the purposes of sport and training it may be necessary to acquire extra wind, just as it is to teach the muscles the trick of extra power, but, except for special purposes, we have a right to raise the question whether a man is the gainer for these acquisitions. Damage looms ominously and we cannot persuade ourselves that, when the books are closed, one will not find a debit balance. It seems impossible to subject the heart, however adaptive it may be, to an undoubted strain, without injury.

Most investigators into this subject lose sight of the important factor that they are dealing with a selected class of risks. From Morgan's University Oars down, the material has not only been distinguished by an initial capacity for such undertakings, i. e., a maximum supply of stamina, but furthermore has not been subject to even average strain of effort

in after life; occupation and social status alike have been favorable. Many of Morgan's men became clergymen or were gentlemen of leisure.

In any just balancing of the ledger, we cannot help believing that many entries would have to be made on the debit side in account with those disciples of strenuosity whose natural outfit is entirely unequal to the task. That applies particularly here in America, where the imitative spirit, the inordinate desire to excel, the evils of publicity and spectacularity, have stimulated the growth of systematic highly-programmed training where there ought to be nothing of the sort. The extension of competition down to the very tap roots of humanity—to innocent little bodies that ought in great measure be left alone to grow and develop with normal increment, seems likely to prove a great evil. The final competition ought to be left to the select few and should be linked to a certain maturity.

Severe competition is not for the period of active growth. For one thing, as a result of over-strenuosity at this age, growth seems to be extravagantly stimulated. There is nothing natural in so many young people of the rising generation shooting up toward Heaven like a bean stalk and showing a great preponderance of length over capacity. The obvious contrast with the previous generation ought to excite comment and discussion. Growth, with few exceptions, ought to be a steady increment and continue much longer into life than the average view allows that it may.

Over-strenuosity at the period of growth must necessarily lead to an over-consumption of energy. The result is fatigue but a fatigue to which the motor nervous system contributes the greater part. What becomes then of the germ of the mind? Can its growth be religiously tended? Teachers of youth that complain of the impossibility of making young folks think might do well to take these questions into account. Is the programme distinguished by over-elaborateness, lack of balance and a general lopsidedness? Sports and athletics cannot be made an obsession without other things being crowded out; an obsession being something that settles (*session*) in the mind and holds it against (*ob*) all comers—we regret to say, oftentimes against the vain knockings of intellectuality, yes, of the spirit itself!

In the search for the best exercise one should have an eye single to the largest considerations and jealously guard against being swept off one's feet by mere programme-making. With regard to exercise it is not possible to be too specific.

CHAPTER ELEVEN

MUSCLE

To make muscle-exertion the supreme test of exercise is to make a fetish of muscle. It is perhaps but natural to fall into this common error. The muscles being show pieces of existence—it follows easily that they should serve as a paradigm by which a man might conjugate himself into physical greatness.

The organic life on the contrary is so very modest and quiet; the “harp of a thousand strings” that strangely keeps in tune so long, is not being constantly jingled. And yet, the exact view of the relations of muscles is that they furnish a plus for the organic life. They are servitors and ancillary. They belong to the externals and should be viewed in their relation to the “innards”, which are of vastly more importance to the owner.

Even the medical mind is often swayed by the ostentation of muscle. “Perfect specimens” even in the judgment of the medical examiner are too often those that, at the expense of much physical exertion, show muscles of forced development. Often as not such men are not specimens of good symmetry nor of fine carriage, and the careful eye will detect evidence of many a screw loose. As insurance risks or with re-

spect to expectancy of life, muscle does not necessarily commend.

In the light of servitors, muscles are only an apparatus of prehension, locomotion, etc. They fulfil utilitarian ends. Crowned with unnecessary importance, however, and measured by physical laws, they are capable of furnishing so many footpds. of energy. In the first instance we shall respect quality and function, in the latter worship bulk; but the finer thing is quality because that implies tone and a nicer control.

The conception of exercise should start from the basis of organic life, of which muscular exertion is, in the last analysis, not an essential part—when we assemble muscle we must make it sustain and confirm the organic, otherwise we make a tyrant of it.

That there is quality in muscle might be illustrated by the hand: its action a product of intelligent direction and of delicate muscular co-ordination; of (fore-arm) muscle bulk there need be relatively little; so that one is emphasizing, not so much the muscle *per se*, as the nerves in play and, back of all, the superior controlling intelligence.

Tone of muscle (Gr., *Teino*—to stretch) relates somewhat paradoxically to the *contractility* of muscle, i. e., its capacity to get into instant action by contracting. Quality and tone then are intimately associated. From the point of view of exercise this puts the emphasis upon muscular exertion that is at once deliberate and well-controlled.

Much of so-called exercise, the object of which is to be just so much increase of muscle mass, is often a very confused and haphazard scheme of producing more and more forcible contractions in response to greater and greater resistance. The result may be bulk but it stops there. You might compare the finely trained hand at sixty, supple, of delicate touch, free as to joints, of good color and warmth, at once strong and delicate, with the hand in the laborer, connected with stronger arms, but lacking the other higher qualities.

Not all so stimulated muscle will increase in bulk—another proof that quality is to be reckoned with. Quantity of muscle seems to go with coarseness of fibre. Some of the worship of muscle can be traced to the failure to realize that muscle strength has nothing to do with strength in the sense of resisting power or vitality. *Energy is not stamina, neither is vim, vigor.*

Equally false-bottomed is the argument that, retroactively, muscle exercise stimulates intellectuality. A greater fallacy never raised its head. We shall return to these points in another place. (*cf.* Chapter 13).

The apotheosis of muscle is raised to the *nth* power of absurdity when a woman tries to cultivate muscle and do a man's stunts. Femininity was plainly created not to have much muscle. The proof is that women can rarely raise much of the article even with earnest effort. If woman would give over aiming to be strong

in the sense of muscle strength, but would substitute broader ideals of physical education, how results would throng; so much more generously does the physical make-up of woman reward the effort to compass physical beauty! Especially does her litheness and flexibility lend itself to speedy attainments, if her efforts be properly directed. On the contrary, the aim at muscle production is quite hostile to progress along these lines. It lays a very rigid hand on woman's suppleness and grace, casts them in a stiff mold and does its best to destroy the characteristic tokens of femininity.

Muscle, as is the case with many things in our physical constitution, is not fixed but furnishes an accommodative change according to demands. Thus, the acquisition of muscle being more or less of a trick, the amount of muscle is likely to adjust itself to our daily needs. We are not all to be blacksmiths or stokers. The effectiveness of muscle and the due regulation of it, as a part of the scope of real exercise, points on which frequent and emphatic stress is laid throughout the book, is of vastly greater importance than its quantity. Failure to recognize this has led to an exaggerated idea of what the human mechanism is capable of or can be expected to endure.

Were we to adopt the *scientific* view of muscle energizing, one would have something quite different. A recent popular book on exercise will furnish it. The scientific attitude which the author tries to maintain,

is comprised in his conclusion that the muscles of the leg are worth vastly more than all the muscles of the chest. Needless to say, our idea, as we have tried to make clear, is quite the reverse.

This conclusion, so our author proceeds, turns on the fact that the leg muscles can give us more *waste products* than those of the chest; in other words can do more work. These waste products are so much stimulus to the system. According to science, muscle, even in seeming rest, is really in action, manufacturing toxins. When muscle is employed in good earnest, it turns out toxins with war time activity. These threaten to overwhelm the organic life and would do so did not the system kindly provide an antitoxin. However, they do batter down the citadel, as our author admits, and the athlete often dies unexpectedly or young. *Ergo* the athlete must not reach this point.

But, saving himself is not exactly a matter of running away. Our author explicitly says—"the trouble with athletes is that they leave off—they should go on." What shall one do to be saved? Listen! our real guide is to be a piece of philosophy, viz., that "feeling tired" is Nature's signal set that you have done enough—a fine piece of empiricism that even Adam might have pinned his faith to. If this is not scientific bathos it comes perilously near to it. To make an even teeter between science and life is often just as ridiculous.

It might be asked if there is not such a thing as the most severe fatigue without much of any muscular

action and in such a case what is our measure of the fatigue? Certainly not the overwhelming of the system with toxins or waste products of muscular activity. Such fatigue is a nerve phenomenon and it behooves us not to forget that all muscular effort involves nerve control, with the possibility of nerve exhaustion.

As we keep repeating, any clear conception of exercise is unlikely, for those so blind as to see in the action of a muscle nothing but the expenditure of so much energy. If a man is to labor, let him spend himself freely—the system will stand it—yes, even profit by it up to a certain point. If he is to lift a weight and knows how, he will use the contraction of certain large groups of muscles for the work and of smaller ones for the co-ordinating. But when we come to speak of muscle in the production of exercise, one will go wide of the mark if one does not stick to the pre-arrangements and pre-ordained functions of muscles.

In what would probably pass for the most systematic work on exercise, by a professor of physical training, we find an apt illustration. In this treatise elaborate attention is given to all the varieties of systems through which muscles are enlisted to make effort. Small wonder then that, coming to the runner—whose characteristic pose of thrown back head and open drawn-down mouth, he depicts with fidelity—he should speak of the *platysma* (*cf.* Chapter on Breathing) as the “last muscle of effort.” This goes no

farther than to say that it is a part of the grand strain.

But the speed of the runner could not be increased by any action of the *platysma*. As well to say that the barber, snapping his eyes as he snapped his shears, was increasing his effectiveness. On the contrary, the *platysma* is a muscle of respiration and the runner is unconsciously striving to increase his thorax capacity. It is the last muscle of effort—but effort to *breathe*—not to *run*.

The *platysma* is an important little muscle because it is at once a muscle of respiration and a muscle of set-up. Let anyone draw down the corners of their mouth and chin and note the effect on the chest; the fibres of the *platysma* reach out fan-shaped even to the hollow of the shoulder; under its influence the collar bone and the upper ribs will be felt to rise quite perceptibly. Now with the muscle fixed, draw the head up and back. The whole upper thorax will be elevated as it has not been before and as it only can be by the co-operation of this muscle with others.

We have spoken of the action of this muscle in the dying and this medical observation settles the fact of its function. The human creature in his grapple with death has been making no effort with his large muscles, as has the runner, but only with the muscles of respiration (chest muscles). When these are stilled once and for all, it is the little *platysma* whose defiance would guard the last flickering spark. (*cf.* Chapter 3).

CHAPTER TWELVE

THE ORGANIC LIFE

It's the organic life that makes the bid for exercise. As God's creatures, we first live and have our being—then we move. The organic life is the vegetative life; that subliminal continuous programme of existence, that wonderful phantasmagoria marshalled back and forth on a stage, the curtains of which are never drawn. Like the procession of the stars, here is the never-resting, never-hasting part of existence. The Bible might have said: "In thy laws do I *vegetate* day and night." With fine poetic touch Watts exalted it into the "harp of a thousand strings."

Of this organic life we know something of the manifestations; of the mainspring, as little as ever. True enough that these last years have seen the re-discovery of the ductless glands and have taught something of their function. It is plain that they have much to do with growth and metabolism, but that brings us but little nearer to the mystery. The story of the ductless glands still remains as a woven fable—we beg the prior question of vitality and of the controlling power.

The organic life has a muscular system all its own. Through this it sees to it that the heart beats, that

rhythmical breathing is sustained, peristalsis of the hollow parts regulated and that there are spun out many other intricate processes of which we know nothing. It is certainly pertinent to the discussion, likewise to bear in mind that the organic life is attended by waste and repair. *The largest percentage of the wastage of life is traceable to the activities of mere vegetative existence.* Activity of mind and consciousness entail waste to the human. We can eat well, assimilate, and use up, without muscular energizing. Therefore we may with propriety raise the question—how far shall one increase one's waste, or why toxins—to make use of the fine-spun scientific theory?

After the organic comes the outward manifestation of life—the mechanism on its muscular side, in a word motion; all motion enlists the service of muscle. We must then view exercise as something grafted on to the organic life. In other words exercise is a part of everyday existence—woven into the warp and fibre of today. Exercise is subject to no storage process—the exercise of yesterday will not serve for today. One must beware of the deceptive exercise tabloid.

Breathing supplies us with a very material proof. *Rhythmical* breathing is entirely unconscious, a part of the organic life; but it lies in man's power to supplement it by *voluntary* breathing, a point to which we have devoted ourselves in the chapters on the Full Breath and on Breathing.

Coming to the heart, whose beating is beyond our direct control (except in rare instances) it becomes one of the problems of exercise to see to it that nothing is done to damage seriously this important organ. This consideration injects questions of great difficulty into the estimate of exercise. We know of two medical men who have had opportunity of studying the immediate effects of rowing on the heart. One contends that the heart for the time being is almost invariably dilated—the other, that it is not at all. Differ as they may, neither is in a fair way to settle the real question, which is, how far can the rhythmical action of the heart be interfered with without resultant damage? Size at the exertion period hasn't so much to do with it as has the interference with the nutrition of the heart wall itself. If tumultuous action of the heart is to cut off regular supply of blood to the heart muscle itself—as conveyed through the *coronary arteries*—then a focus of weakness may be developing that may lay a train for real disease of the heart muscle in after years.

There are of course other ways than mechanical, of producing the same interference with nutrition. All organic life, including nutrition, is under control of the sympathetic system;—but this is the organ of the emotions as well; therefore care, anxiety, passion, can get a strangle hold upon our organic life and can undoubtedly work more evil than can the severe muscular energizing. A state of mind, which is another

way of saying a state of nerves, has great bearing upon the organic life. Thus, exercise should be as cheerful as possible. We have made this point the subject of farther discussion in the chapter on Games and Sports.

The relation of exercise to the organic life, bobs up in another phase, viz., the matter of growth. What for example are the requisites of exercise in the child? One may learn something by inquiring what exercise the baby takes. Then is the period of greatest growth, yet the baby does more than its proportional share of resting. Its exercise is confined to kicking and reaching, crying and laughing, and the exercise in these acts is mainly chest movement, breathing and a stimulated circulation. Nevertheless the organic life is at a high pitch and the baby both thrives and grows.

Here is a lesson for our directions to the child. For the child, muscular activity may never be made an end in itself nor exercise have in focus the acquisition of muscle. A child is so active that the organic life is always sufficiently stimulated. In a healthy child the circulation ought always to be naturally good.

The child should have instruction in and practise a real set-up and be taught how to breathe. Further than this, games should furnish a sufficiency of muscular activity. It is over-fatigue of the nervous system that should be watched. For the average child the motto is: Rest is growth.

Fineness of structure, the delicate poise of its bal-

ance, mark the organic life as a trust committed to our care. Here is the consummateness of physical life—here our altar—here dwell our Lares and Penates. Nature has her own intimate economy but we are to take a hand in the housekeeping. We must have the splendid ideal of a trust to keep. It is ours to so adjust our active part in life as not to mar or damage.

CHAPTER THIRTEEN

PHYSICAL CULTURE

PHYSICAL culture should be in every way identified with all culture. Its aim, the establishment of standards and ideals. It cannot be too broad; it cannot then be a cult, which is another way of saying an obsession. Physical standards include all things having a bearing upon physical well-being.

Man was created only a little lower than the angels. One fails to take cognizance of this in any conception that ends in placing the body in an independent category. Man has a body but is *endowed* with a spirit and a mind.

One of the most abhorrent reductions is the classification of the body as a machine—obedient to and measured by the usual physical laws of the universe. This results in the very mischievous and very lopsided apotheosis of muscle.

The comparison of man with a machine begs the primary question. All the mechanism of man is part of a *vital* machine. There are no new parts short of Heaven. Every phase of man's mechanical activity ought, in any broad scheme, to be considered in connection with his organic life; trussed up with the idea that we possess a fund of vitality whose principal at

least ought not to be drawn upon till necessity compels—on the contrary is to be husbanded and if possible added to.

Standards of athletics are not acceptable for real physical culture. They are temporary and fitful and revolve altogether too much about a desire to win. It is hard not to persuade one's self that they result in an indifference if not disgust towards real exercise.

With the stimulation of the contest withdrawn, athletes go stale or perhaps go to seed. "Account overdrawn" may be said of their capacity for exertion. Under the illusory spell of "training", the modern athlete comes away with an exaggerated idea of system and quite deluded as to the nature of exercise. The man with correct physical standards never breaks training. His programme is for daily observing. One does not need a drill master for every-day discipline—one may be a good soldier without donning a uniform.

Nor may any marvellous progress be made by elevating physical culture into a science; establishing an institution with a four years course, the curriculum "enriched" by the mere aggregation of items: pertinent, remote or bizarre.

Culture, and education, is in all cases a growth—a quite unconscious evolution. Make the goal too definite and we are not so sure of fetching it. Much of the real assets of education is supplied by indirection and collaterally. So in physical education. There is no very direct route, much less a short cut. Instruct-

ors are often not exemplary, any more than are athletes. "The lyfe so short—the craft so long to lerne."

Real physical education ought to be broad enough to inculcate ideals of physical beauty and the perfection of life. It should result in a respect for the body and its integrity. It should impose the vows of a life-long devotion to these ideals. What we call general culture fires us with a zeal of the mind and spirit.

So of physical culture, the idea of beauty and the consummateness of all life should be supreme. We are not to build our conception of physical education around a mere perfection of the body, but to the lines of a more glorifying sublimation of the human creature. One must take care to think in terms of all-roundness. Of this, we hear nothing. A contest in which prizes for physical beauty, in any large sense, are offered, is not on the boards; we have instead the strong man and the pan-athlete. Of a certainty then one would not go to athletics for standards except to an arid field to be well tilled. The ideal of beauty in the Greek sense has not much in common with modern sports or muscular exercise, though that is not to deny that such things might find their place in the scheme.

In the mere physical beauty of the body there are three factors, any of which can be demolished by strenuousness. First, skeleton and ligaments—their ratio, adjustment and tone. Second, muscle,—to give outline. Third—fat, to soften these lines. It is only by

taking thought that ideals can be attained. No hazard violence can do aught but violate.

Physical education at the hands of its propagandists is always being exalted as the specific for producing a *mens sana in corpore sano*. It is well if one understand this much abused phrase, because it has performed the feat of carrying much error on its back. *Mens sana* is a "wholesome mind". This, as well as a "sound body", the body carrier may possess.

To use this phrase to prop up any contention that activity of the body on the physical side has its direct relation to the processes of the mind, is a gross absurdity. That there is a relation of mind to body admits of no dispute. But the relation of body to mind is more hazy.

The only nerve processes stimulated by muscular exertion are those of the motor tract—not at all, those of the grey matter. Muscular rhythm can go on without much supervision of larger centers; especially the play of the larger muscular apparatus—coarse energy.

Mind gathers strength by the storing up of impressions and experiences, the establishment of connections between the various storehouses, the stimulation of reasoning processes.

What has activity of the motor tract to do with this? There have been minds of the first order without much body; this combination may not be desirable, but we must first have the mind. The mind is an entity; not simply mind, but "the" mind, as the Greek had it. As

the brain is the habitation of this mind the right exercise should be of influence perhaps, by furnishing a proper circulation; but to say that minds wander round in gymnasia, why certainly they are not so polished that one may catch the glint.

CHAPTER FOURTEEN

EXERCISE IN HEALTH

IT HAS been our endeavour to demonstrate that there are principles underlying exercise. Having compassed the idea of exercise, one must adapt it to one's daily life. Now the specific application is up to the individual. No hard-and-fast programme will comport with the many-sided life of man. But let us begin by emphasizing the fact that the inherent tendency of the human economy is toward health. We must see to it that we meet Nature half-way.

A man's prescription of exercise for himself must have a general therapeutic aspect, as it were. The specific ingredients that he compounds must be those most congruous with his daily life and occupation.

He will consider first of all the sum of the physical fatigue to which the day exposes him. If that already mount high, he will not believe himself to be the gainer if he adds to that fatigue by over-strenuousness, placing the fresh fatigue on the credit side just because obtained through other sources. If he have spent his time in bad air he might persuade himself that his first need is fresh air. If he be fatigued by the worriment of too exacting detail, he will search for a

really wholesome and absorbing recreation. If his occupation be wholly lacking in muscular work he will keep in mind the advantage and indeed necessity of moderate muscular energizing.

But speaking broadly, if one gathers up the hints of this book he will have something of a quiverful without too exact a programme. Everybody can take exercise as we have outlined it.

A point on which we would lay great stress is that in exercise, regularity should be a part of our daily gospel; something daily done for the sake of exercise. Nature loves routine—the same rations of any kind. The more we see of exercise the more we are impressed by the benefits of habit. There is to be no salvation in extreme exertion but a saving grace in the small but intelligent efforts.

Mankind in general does need more real exercise. Human creatures owe their systems a debt, but from false ideas of exercise they forget that the debt must be paid in small instalments. For example, it has appeared to us the height of folly for young hard-working men, after a full day, to devote themselves to severe rowing. We believe the history of these men would furnish a melancholy tale. It is the same with athletic sports for the young working man. The system may not show damage at once, but it will in the end.

The amount of exercise, though from our point of view difficult to estimate, should be adjusted to the employment—to the state of the system and even to

the weather. One does not always feel equally disposed and should not always compel. The *quantum sufficit* of exercise cannot be considered a fixed quantity.

Sedentary occupation demands such sufficiency of muscular energizing as to precipitate enough waste and keep the system well balanced. But, as we keep insisting, this muscular exertion need not be too obvious and may be harnessed up incidentally to something congenial. A good rule is that if one sweats, one is working. Effort does not begin with muscle, it is to be remembered.

Exercise on arising, is especially worth while. Here is the best preparation for food and the best stimulus for functions. During repose the stomach becomes contracted. Exercise gives it time to dilate and prepare its digestive fluid.

We should all have part of our exercise in the open air, walking perhaps, or a really exhilarating game. A walk the last thing at night has its good points.

Everybody needs a systematic setting-up daily. That which this book offers has the merit likewise of a good degree of real exercise. Having acquired this by attentive practice, the habit gets a hold, so that one can be expected to do a bit more of deep breathing, chest elevation, rotation of the shoulders, etc., during the day. If persons only knew the great advantage of not going too long without attention to these points, they would be quick to adopt them. If for instance

it were within the clerk's range of opportunity and inclination to go periodically to an open window and take some real exercise with the chest, this would make a great difference to his sense of fatigue and to his health.

The daily walk-for-exercise should also be part of our daily routine. This is not difficult for everybody to arrange. It may have to be taken piece-meal, snatched out of an unnatural setting, but with observance of our directions wee bits may be made to cut a large figure. Merely being on one's feet, it is well to remember, is not walking-for-exercise. With the mind upon it, however, an aggregate of short stretches even can serve the purpose.

The periodical thorough stirring of the blood—the exciting of small but sensible perspirations—the maintaining of cutaneous transpiration—the power to keep the extremities warm and the head cool, respiration measured, deep and slow, the heart deliberate and steady in rhythm: is a functional programme that sets us some stunts. In carrying it out we conceive the body as a living automaton, (with reverence be it said) self-energizing but extending to man abundant opportunity for synergizing.

The aim of exercise in health ought to be preventive, which is equivalent to saying the development of *stamina*. In this the cardinal factor of prime importance is attention to the circulation. Keeping physically fit is not the capacity to do an athletic stunt, but the

building up of complete symmetry in bodily functions, i. e., keeping the whole intact.

Keeping fit refers not only to day-to-day conditions, but to a capacity to resist (*stamina*). Throughout we have laid great stress on the importance of circulation and its value as an index to condition. We have made our conception of exercise turn upon the circulation and its maintenance. The primary aim of exercise is to influence the movement of the body's fluids; in this the Aspiration of the Thorax plays an important *rôle*. Given blood of good quality and secure its proper conveyance about the system and we have in its main features the condition known as health.

Through this man helps create the priceless possession of an adaptive capacity that carries the ability to meet radical changes of diet and climate, to withstand hardship without inuring, and to stand off disease.

CHAPTER FIFTEEN

EXERCISE IN ILL HEALTH

OUR conception of exercise better fits ill health than health even. All ill health and disease involves an interference with the normal circulation—resulting in either an unbalancing of the same or in cell changes in organs. The final death of the cell may be said to produce the abrogation of function and to pave the way for the inroads of disease. The circulation must be looked at as a whole. One cannot affect the major cyclosis without the influence extending back to the ultimate radicles. Thus, good gastric juice depends upon the circulation in the walls of the stomach, which in turn is dependent upon the main currents.

If we take the finger, e. g., we shall find a most admirable guide to the circulation—in its way, one quite as good if not better than the pulse. The nail grows on a bed called the matrix. This matrix is a dense mesh of capillaries, hence very rich in blood. The matrix is also an organ because it has a function, which is, constantly to deposit new nail. Here then there is an opportunity for direct inspection in a rough way of the circulation in internal organs. If the circulation in the nails is good, so by inference is that in

the interior. So important is this that if left with but a single test or item of information to go by in the selection of a risk, we should fall back upon the circulation in the nail.

The walls of the heart are very prone to degeneration. Their blood supply is carried by little arteries, arising from the great vessel (the aorta) just after leaving the heart itself. There can be no doubt that this feed of blood is vastly influenced by regularity in the movements of the organ within the chest as determined by the regular and rhythmical movement of the chest itself.

In the case of laboring heart from any cause whatever, we have observed the utmost good to come from well-regulated use of the chest and abdomen. Especially in the full breath well carried out, man has a great safety valve. The high degree of Aspiration combined with the previous lowering of the heart's position during the abdominal phase of respiration, ensures a most thorough emptying of the organ with consequent relief of the block.

In the presence of chronic diseases of any kind, especially later in life, the object of exercise should be to lead the system back by gentle means; one should not resort to violent muscular exertion, which often enough is nothing more than an obstacle to progress. There is even danger in a sudden adoption of muscular energizing in advanced years. Instead the case may need rest and careful regulation. It is a mistake to

commit one's self to the tender mercies of trainers whose one idea is of muscular exertion of extreme violence.

An ill man often thinks to do with his muscles what he did forty years before, regardless of changes in heart, kidneys, and circulation. Great muscular exertion is only for select cases. "Take more exercise" should be coupled with "rest is a great restorative." Men are prone to grasp at violent exercise as a drowning man plucks at a straw. Muscular action is more or less of a trick—thus one sees remarkable power in the muscles combined with much decreased vitality. Dying persons even may make muscular exertions of great force.

In high blood pressure, proper breathing coupled with Aspiration of the Thorax as marked as possible, is of the greatest service. This is in fact the most rational means of correction because it relieves the pressure by diminishing resistance. The contracted artery and the overworking heart are eased, immediately that the barrier ahead is knocked down. Through Aspiration this barrier will be attacked from the rear, so to speak.

In tuberculosis, consistent rest has been adopted so universally that exercise is a jarring word. And yet exercise of the sort we describe ought to be just so much of an adjuvant. Particularly is one confronted with the problem of keeping up the most active possible circulation. The life of the lung's cells is of the

first importance in increasing the resistance to the disease. In maintaining the integrity of the cell, our unit of circulation is the controlling factor (*cf.* Chapter 5). Therefore exercise directed to the circulation must always be in place.

CHAPTER SIXTEEN

WALKING

"WALKING is good exercise." How often is this verdict rendered—usually by non-walkers. The family of walkers is not any too numerous; a good walker is a rare bird. We agree that walking furnishes exercise of the first order, but propose to substantiate our view rather than make a merely casual observation.

Taking, as this book does, the circulation as the best test of exercise—walking then may be said to offer very complete exercise because it is a very perfect equalizer of the blood currents and distribution. The proof of this is, in actual practice, the pleasurable glow that walking produces—our internal fire is stirred just sufficiently to produce a flushing of the skin capillaries and a gentle perspiration. This in itself is a proof of real exercise, since surface circulation is an index to circulation in deeper and more important regions and organs. (*cf.* Chapter 15).

In walking, the color mounts, but not to the point of congestion. Many severe methods of taking exercise produce that greater degree of flushing of the skin which is accompanied by drenching perspiration. We

must insist that this is to be reckoned as work and as not altogether desirable from the point of view of exercise.

This circulation balance that walking produces can be demonstrated in another way, viz., by exhilaration. Mr. Weston, the great pedestrian, has borne witness to the fact that walking is the best thing for the spirits. What a noble tribute to the art from one who has spun out his weary miles by hundreds, often, no doubt, to the droning refrain of "shall I never get there."

Now this is a cardinal fact about walking, to the truth of which we can testify after well-nigh fifty years of daily walking, and it is easy enough to see why. In walking, breathing is perfectly free and is just sufficiently stimulated, or may be made the object of special attention. Respiration is the great equalizer of the circulation (see Chapter on Aspiration of the Thorax, and the explanation of a sigh). High spirits is conditioned upon a well stimulated circulation—low spirits on the opposite.

To provide good exercise, walking should be a deliberate and resolute undertaking, done for the sake of exercise. Therefore it cannot be sauntering or meandering or taking a "constitutional", but there must be vim in it and the miles must be steadily planked out. One must throw themselves into it.

Since one needs all one's breath and needs to keep in focus the complete control of the respiratory apparatus, the best companion of a walk-for-exercise is one's

own mind; the next a taciturn chum. The little boy, admonished to do only one thing at a time, countered by replying that his Nanny could do three things at a time, "Knit, thoke her feet, and read the Bible." The solitary walker has the same privilege. He can take exercise, take in Nature's grandeur, and think.

In walking-for-exercise, methods and accessories are highly important. Paradoxically one can walk with his feet, his abdomen and with his shoulders. The feet are always in it; the abdomen partly, the shoulders frequently never.

The feet should not be turned out. The faster the cadence and the longer the stride, the more inclination to toe in. Runners toe in, or ought to. This is because the faster we go the more we can narrow our basic center of gravity; thus in bicycle riding. Then too the body should incline forward from the hips, so that a line dropped from the fifth rib would be well in advance of the toes. Toes should be kept near the ground, though they cannot strike the ground first, as a well known physiology erroneously asserts. The idea is to keep the foot flattish and, in a way, skimming along the ground. In walking, the majority do not sufficiently incline the body; bending backwards, the feet fly into the air and the heels are banged down forcibly on the ground. Try to keep the feet chasing the body; the whole foot clinging to the ground behind to the last moment, the leg well straightened, the foot never in advance of the eye.

One may walk more with the abdomen, so to speak, by here and there sinking on the hips alternately. This is by no means trivial. It stirs up the abdominal organs and plays its part in stimulating their activities.

The management of the shoulders is of very great importance in walking-for-exercise. Not long since there was published a magazine article on walking, in which a physical education professor taught that the shoulders should be absolutely still, with the arms immobile at the sides. With this we entirely disagree. On the contrary the shoulders should come into it to good purpose; shoulders not arms! Arms swinging loosely and even widely, do not fulfil conditions. Arms should be firm and comparatively rigid; the upper arm held well to the body. Bend the elbow but little.

The back of the hand should by no means turn to the front—rather the thumb and forefinger, which should then be rotated outward as the shoulder rolls back on the chest. In alternation with the step, the arm and shoulder as a whole should be rotated round the chest (as in various of the author's movements). The shoulders alternate with the step. Thus when the right foot is back the left shoulder is forward. With the upper body firm and well forward of the perpendicular there results some rotation of the trunk as a whole, and a very decided and well-balanced swing to the gait. The product is an enhanced activity of the chest and thereby of the respiratory apparatus. That this administers a decided fillip to the

circulation, admits of actual demonstration. Test it out on a sharp day in Winter and observe how the extremities warm up immediately, in line with the increased chest action (*cf.* Aspiration of the Thorax Chapter 5).

The accessories of walking are important. The best atmosphere, the best weather, the best footing. Seek out the purest air, the brightest sunshine (there are even those that are unacquainted with the sunny side of the street), the most glorious view, the widest outlook. Shun the city streets and shops. Go where there is good footing. Unfortunately this is hard to find near the city. That there is so much in our parks that the hand of man has put his stamp upon (artificial stone, cracked rock) is proof that there are few walkers—otherwise there would be a protest that should be heeded. Get the turf or the wood road to plant your feet upon if possible. Rubber soles make walking much easier.

Sunshine is fine—so are storms. Easterly weather near our coast is very stimulating. Go out and encounter the elements; only bear in mind their power, as you would that of the sea in surf bathing. A wrestle with this power should be allowed for—particularly by older persons. Make chums with all sorts of weather if you are young.

One advantage of walking-for-exercise is that, like the poor, we have it always with us. Fortunate the person who is obliged to walk. He may perhaps get

his introduction to the benefits that walking brings.

A good walk produces a decided inclination to sleep. Since rest is the partner of exercise it is a good thing to sleep for fifteen minutes after a walk taken for exercise. The deliciousness of falling asleep is never better realized.

The Golden Rule of exercise is regularity. Nature loves routine and steadiness and bestows her especial blessing thereon. Constancy in the faith therefore should be part of our daily gospel and a walk not missed. Occasionally one should make a long walk—a real tramp. But nothing is so silly as the not even semi-occasional strenuous “hike”. That is trying to take your exercise as a concentrate; exhausts but does not prepare.

For a single concluding word—in walking-for-exercise one must pay strict attention to regular breathing and the use of all means to stimulate the movement of the chest according to the principles laid down in this book. Thus, one cannot smoke and walk-for-exercise at the same time.

CHAPTER SEVENTEEN

FAT

FAT is anathema to devotees of muscular energizing or to the trainer who wants to see muscles stick out like whip-cords. So likewise it is abhorred by various others who think it unsightly. A prejudice against fat amounting to an abhorrence, ought to be condemned. Fat is as much a part of the flesh as muscle—and as necessary.

First it is protective—nerves wrapped in it, to use a questionable metaphor, are less sensitive—probably the truth is that the temperament is calmer where there is more fat.

Fat gives a fine outline to the figure. This presupposes first, just the proper quantity; but more than this, well developed muscles of good tone. The fat should connect intimately with the muscles, i. e., be underlaid by them as mortar by a brick—in that case the fat itself has tone in a certain sense, follows the movements of the muscles and corresponds to them in its distribution. To illustrate—the lines of the abdomen, as determined by its muscles, can be perfectly well kept even under a considerable over-lying layer of fat. We see the point emphasized in the cheek

dimple, where the action of a muscle produces a hollowing in the fat of the cheek. Fat, then, which doubles in ugly rolls, is not only redundant fat but not muscle-controlled.

Fat too, is part of the resisting power of the body, a source of heat and life. The imprisoned pig that lived so very many days, was living on his fat.

The distribution of fat is important. General fat deposits by election, i. e., it is natural to have more fat in one part than another. This natural selection is not to be interfered with successfully. Therefore, if otherwise plump, there is nothing for the woman with stout hips to complain about.

When muscle is overlaid with moderate fat, there is no interference with the action of the muscles. But internal fat is much less desirable. That can and does interfere with muscular action and the proper play of movable organs. In the abdomen sometimes the muscles are squeezed between outward and inward layer of fat, as between two millstones, and the result is atrophy. One can then say, the muscles become fat-bound; convincing one of not energizing properly, and this with the remedy so close at hand. On the contrary the heavy person can be the lightest stepper—illustrating the preponderance of muscle over fat. Too much weight below the waist we look upon as so much dead weight.

But it is never to be forgotten that the tendency as to fat is somewhat of an inheritance and a condit-

ion to be governed by that law. In such a case it is silly and often injurious to interfere. This cannot be done with impunity, especially in the form of a sudden assault by patent methods. There is danger if there are already weakened organs. The longest way round is, here, the shortest way home.

In fine, it is often better to seek control of fat through muscular action than to strive to reduce the amount, with the result only of disturbing the relations.

CHAPTER EIGHTEEN

REST

REST contributes an integral part to exercise, because complementary to it, or we may say rest is cousin germane to exercise. What we consider false ideas of exercise have conspired to produce almost the opposite attitude. Continuous muscle energizing is not real exercise, though many seem to think so. The over-stimulation of energy is an everyday matter. The number of the chronically over-tired is legion. The American idea often is, to feel as energetic at night as in the morning. Hence, coffee, tea, and alcohol, late in the day. There is need of a proper concession to the demands of repose as a part of the organic life. Repose is not necessarily sleep nor lethargy—it is calm and poise—the happy medium between lethargy and over-strenuosity.

The tyranny of muscle criteria of exercise is capable of much evil. So also is the habit of over-strenuizing. The idea that energy begets energy has something to say for it, but only if rest is an intermediary. This idea may produce the young person with dilated pupils that shakes hands by thrusting a rigid bar at you and giving a grip of iron. "Feeling like a fighting cock"

may be only another way of saying "looking like a hen out of the horse trough." There are those that seem to live for muscle energizing, whereas its proper field is to prepare for rest—to earn one a night's repose.

Athletic stunts are a gruelling affair. The frequent repetition of the same muscle contraction produces an especial fatigue of the nervous system, because it is hardest on the motor nerves. There is in this a primary error in failing to take into account the importance of mind and the organic life. On the contrary there are those that are fatigued from lack of real exercise.

The clerk sitting all day at his work without change of air is fatigued in another way than the blacksmith. The clerk's fatigue is a combination of brain tire, muscle kinks, stagnation of blood and bad air. The blacksmith's represents for the time being, too much muscular exertion. The blacksmith plainly needs a rest. To tell him, as is so often done, that he hasn't exercised properly because he hasn't used the muscles of his legs and that he needs to get out and run, is to add insult to injury. What the blacksmith needs is to lie down or something of the kind. He has earned his night's repose and a little extra.

How about the clerk? Does he need to go and do the blacksmith's work or something analogous, as in a gymnasium? Not at all. The clerk needs better air, what might be called freedom exercise and a true setting-up. What better for him then than real walk-

ing-for-exercise in the open. But no! he quite as likely is caught up by some infection of specific muscular energizing in tabloid form.

The usual advice to the clerk and blacksmith is equally false. Each situation has a middle ground of error—the tyranny of muscle criteria. Either case begs the primary question of how much and what the human mechanism can endure. The one man is fatigued from lack of real exercise, the other from muscular work. But, after all, each is to recover, not through prescribing more of the wrong thing (mere muscular contraction) but by emphasizing the importance of the organic life and insisting upon the necessity of freedom and variety in exercise.

If in this way the view be broadened, we may say that real exercise is often a specific for fatigue or that fatigue often betrays the lack of real exercise. In any case the remedy runs from real rest and plenty of it, such as “making a business” of sleep, to exercise of a character to be really restful.

APPENDIX

- (a) SCHEME OF CHEST MOVEMENTS
- (b) ESSENTIAL FEATURES
- (c) DIRECTIONS
- (d) PREFATORY NOTE
- (e) ILLUSTRATIONS

SCHEME OF CHEST MOVEMENTS FOR EXERCISE AND SET-UP

THE movements offered in this section are the result of careful study and much personal experience. Having made use of them for many years and having observed their employment by many patients, we feel sure that, being a close adaptation of the principles laid down in this book, they offer at once a very beneficial amount of real exercise and at the same time a particularly good set-up. They may be designated most precisely as chest movements (or otherwise abdominal) and involve certain very important features which it is well to grasp before entering upon a try-out of the movements. Even if they might seem at first glance to have a familiar look, they are not "the same." The movements are not arm movements and are quite the opposite of free.

They are likewise relatively simple, (in their composition, not, though, in the doing) because we believe in setting the muscles to do what they were intended to do—in other words orderly action with an object. That object in the case of many of the movements is to procure the utmost possible expansion of the thorax. They thus differ from the countless evolutions

offered by systems where the amount of ingenuity expended in devising intricate and aimless muscle manoeuvres is almost ludicrous.

They depend upon the principle before alluded to, that muscle, in exercising its function of shortening the distance between two points, can act in either direction, according to which point is fixed. In pretty much all of the movements the arm is made as rigid as a pump handle by stiffening the wrist and elbow, i. e., these joints are thrown out of commission. In this way a turn of the hand can be communicated to the shoulder; or in another case, by fixing the arm close to the side, through contraction of the muscles running from the thorax to the arm, a motion of the arm is communicated to the chest, i.e., the arm acts as a lever upon the chest. In another set the contraction of chest muscles is passed along to the arm, i. e., the motion of the arm (as a whole) is governed by the chest.

This all results in the chest being raised and expanded either through the action of its own muscles or secondarily through the leverage action of the arms. Since this tugging and leverage increases the dimensions of the thorax—which is the act of breathing—the movements, if not made too hurriedly and if a return to a condition of repose be frequently made, are, of themselves, equivalent to activators of breathing. This can be readily enough proven if one observes the noticeably long expirations that follow the turn.

The scheme takes into account *seriatim* the various muscles of the body according to groups. Since the movements are carried out with wilful attention the result is that one gradually becomes conscious, so to speak, of each group. When this point is secured, the outcome is, to make possible a direct contraction or toning up of the group at will.

This puts a very desirable power into our hands. Man can set his head up into the air or can by merely giving thought make himself breathe with more completeness—indeed one is likely to, unconsciously at that, merely from the repetition of the movements. Thus, for the purpose of our ordinary respiration, it becomes an easy matter to make it abdominal first and chest second instead of as most do, merely feeble chest. So with the set-up. It is the separate message to each group of muscles that, if answered by a response, produces a good set-up.

The movements, at least during the execution, result particularly in an elongation of the chest with a hunching of the shoulders. Their tendency then is to make shoulders permanently higher and to broaden the upper thorax. Thus we have the making of high and wide shoulders.

Obviously then they offer a correction of sloping shoulders. A good shoulder ought to point high and have a sky line about horizontal, running off abruptly, with a little hollowing, from the downward-sloping *trapezius* muscle. The shoulders ought to make a cor-

ner to hang a thing upon—they ought not to be absorbed by the body, but together with the arms, stand forth from the body as something distinct and independent. Mobility of the shoulders is of the highest importance—the shoulder ought to take part in arm motion to a much greater extent than it does. In still shoulders we miss entirely their leverage action on the upper chest.

The position of hunched shoulders, to which we have alluded as induced by many of the movements, offers in itself a decided lightening of the chest. There is necessarily a change in the relation of the internal organs. Thus, hunch the shoulders and keep them so while breathing. It will be found that respiration is facilitated and is accompanied by unusual internal sensations. Particularly can the inspiration be felt at the pit of the stomach.

To sum up—these movements at once: increase respiratory volume—through Aspiration stimulate circulation—furnish a set-up—give a conscious control over the power of the most important sets of muscles.

ESSENTIAL FEATURES COMMON TO THESE MOVEMENTS

1. *The one-piece-arm*—The forearm is fully extended on the arm as if pushing—the hand is bent backward (extended) on the wrist—the fingers are stiffened and clawed—all the muscles are very taut—the elbows and wrist joints are put out of commission—there is no motion in these joints; they are locked. The one-piece-arm throws all the motion into body and upper chest.

2. *Heave of chest and body*—The front of chest is drawn up towards neck—the neck is stiffened and the head drawn up—finally the well fixed head and body, as a whole, are bent backward to an angle of 45 degrees or thereabouts.

3. *Hunching of shoulders*—Many of the movements, if properly done, lead up to this position. At the crest of the movement take down the arms without disturbing chest and shoulders and observe whether chest and shoulders are hunched.

4. In nearly all the movements start with the *body held erect* and the *head very high*—spine and neck to be kept very firm.

5. In nearly all movements the *arms are held stiff*, even when one-piece-arm is not specified, and the *upper arm snugged in* very close to side.

6. Do movements slowly and rhythmically—put conscious contraction into the muscles and an especial will power at the peak of the movement. Put your mind upon the group of muscles involved—Stress the finale for a moment.

7. Observe the exact details. None is unimportant. They have been carefully adapted. Some make the *crux* of the movement.

8. Motions concerned especially with neck muscles (Nos. 29, 30, 31, 32), while not figured, are very important for the set-up, and should be carefully studied.

9. While learning, the movements may be done perhaps three times in succession at the rate of fifteen per minute—after every third come to rest—relax chest.

10. Ten or fifteen minutes at a stretch is long enough—on arising, for regular routine, and perhaps before retiring—in a cool room with the trunk uncovered. Some of the movements, it is hoped, will be in mind and be done, even if incompletely, through the day. The movements after acquiring will naturally be consolidated into a composite in which one glides into another. Whenever both sides of the body are not in action at once, L. and R. are to alternate rhythmically.

DIRECTIONS FOR THE MOVEMENTS

NUMBER 1

The body leaning forward from the hips—the knees slightly bent—the hands with outspread fingers embracing the front of the thighs—the arms hugging the body closely. Draw chest up—keep abdomen in; use downward and backward pressure of hands for counter-resistance. Keep back and back of neck firm. Finally press elbows in towards small of back, thus carrying shoulders round the chest. (See Fig. 1 for final).

NUMBER 2

Place V made by thumb and forefinger, the thumb behind, above the hip bone—the fingers spreading out over the abdomen—make heave of body and shoulders against downward pressure of arms. Thumb and forefinger must be anchored and not once released—other fingers may change position or knead the abdomen. (See Fig. 2 for final).

NUMBER 3

Lay one flat hand on the other—place them over the lower abdomen—arms hugging body well. Pull up the

chest, following with abdomen through an upward pressure of hands and forearms—hug body tight with arms—finally raise shoulders. (See Fig. 3 for final).

NUMBER 4

Hands clasped over most prominent part of back of head—elbows closed—head down—rock the head backward—make counter-resistance with pull of arms; should feel hard pull on upper spine—elbows not to be opened. (Not figured).

NUMBER 5

Stand erect—about same start as No. 4, head perhaps not dropped quite as much. Draw head back as in No. 4 to the fullest degree, rise on toes; keep elbows as near together as may be and as long as possible, raising upper chest and shoulders to full limit. Then open elbows. In opening elbows make extreme traction between them and chest. (See Fig. 4 for final).

NUMBER 6

Stand erect—tips of fingers on upper chest just below end of collar bone—elbows resting on side of chest, arms held close. Make elbows describe a circle from without inward. When the points meet carry them up, keeping together as long as possible and through the arm leverage raise upper chest to extreme limit—rise on toes and draw head and body very far back at the same time. The arms must follow along

DIRECTIONS FOR THE MOVEMENTS 125

close to chest. As the elbows separate and rotate outward the movement is over—relax and return to primary posture. The fingers must not leave their place, though the hand is allowed flexible play. (See Figs. 5 and 6 for the half-way and final).

NUMBER 7

Tips of fingers in same place—elbows raised to horizontal at sides. Raise chest and shoulders without changing relation of arms. Horizon of arms should rise about two inches (Here see Fig. 7). Then follow up by raising elbows to the extreme—rise on toes. Fingers always in place (See Fig. 8 for final).

NUMBER 8

Single-piece-arm (R) rotation at shoulder (very important—enters into many movements). Head, neck, and chest well pulled up and back to left—the one-piece-arm is thrown over as far to left as possible, inner edge of hand to front (See Fig. 9). The arm as a whole is to be rotated round the body backward. The arm hugs the body closely; all the motion is in the shoulder joint. The arm finally arrives at a position somewhat to the rear, the palm of the hand looking out to the right—the thumb directed backwards—put as much force as possible into the last part of the rotation and feel the contraction in the rotators at the back of the shoulder; at this point draw up and away

as much as possible with the chest (See Fig. 10 for final).

NUMBER 9

Same with (L) single-piece-arm (Not figured).

NUMBER 10

Both arms single-piece at side—Fingers clawed back—hand bent back so as to be horizontal—arms cling close to body—rotate round body to front—By sharp contraction in upper chest, draw sharply in so that thumb strikes thighs. (See Fig. 11 for final).

NUMBER 11

Same position as for No. 10—extreme rotation (round) backward. Ought to make contraction of posterior rotators of shoulders very marked, almost painful. (See Fig. 12 for final).

[Nos. 10 and 11 constitute a pair—Combine into back and forth motion, with action of body in opposition.]

NUMBER 12

One-piece-arms—horizontally out from sides—hands one foot in front of transverse—whole arm thrown over strongly—inner edge of hands up (See Fig. 13)—*Turn at shoulder*—arms end in opposite position one foot behind transverse, palms up—hands describe arc of about two feet. Resist with body. (See Fig. 14 for final).

NUMBER 13

Same done obliquely—start with hands somewhat forward two feet above horizontal—inner edge up—

DIRECTIONS FOR THE MOVEMENTS 127

one-piece-arms (See Fig. 15)—end with hands in opposite position behind—throw body forward in counter-resistance as arms go back—all rotation to be in shoulder. (See Fig. 16 for final).

NUMBER 14

One-piece-arms—fully extended well-out from side—shoulders hunched (See Fig. 17)—draw whole upper extremity down and in against body very forcibly with front and back body muscles—thumb and forefinger turned towards body will ensure greater use of front muscles;—(cf. Fig. 33 for front final)—inner edge of hand turned in: more use of back (cf. Fig. 36 for back final)—shoulder and arm all one piece—free up and down motion of shoulders:—keep body very firm.

NUMBER 15

Arms outward, strongly extended horizontally—hand and fingers and thumb together, thumb side up—stance. All muscles well firmed up. Sway body on hips, keeping hands and body in same transverse line—parts actively involved are abdominal muscles. Outstretched arms should not change position but make always a cross with the body. Try to get hip into a position as directly as possible under upper hand. The body sways forcibly (but slowly) on the hips (See Fig. 18 for final).

NUMBER 16

One-piece-arm at sides—pass first one arm and then the other alternately across the front of abdomen—keep hand traveling close to front of abdomen, inner edge leading, palm to front—abdomen in, body leaning forward, hips firm—motion is from side to side—keep consistently within transverse plane; do not turn the body—action of abdominal muscles like that of a pair of cross straps pulling alternately. Carry under hand as far to opposite side as possible. (See Fig. 19 for final).

NUMBER 17

Arms loosely at side—swing forward and upward. When half-way to horizontal pull them up to a complete horizontal by a chest-body motion, contracting chest muscles in front—drawing body and head back sharply to throw hands up (heave of chest)—hands may then be approximated—thumb and forefinger are up—Idea is to put arms up through agency of body. (See Fig. 20 for final).

NUMBER 18

Arms horizontally out from sides. With the same back motion of body and head (as in No. 17) draw arms up over head—gradually approximating hands—In rising, backs of hands to be turned towards each other with thumbs to front. Head and body drawn so far back (about 45 degrees angle) that face is directly up, with eyes fixing hands which reach a point

DIRECTIONS FOR THE MOVEMENTS 129

directly over—body is also drawn down as in movement No. 29. Arms are not to move of themselves—they ascend only in correspondence to contraction of chest and retraction of body. (See Fig. 21 for final).

NUMBER 19

Golf swing—Feet separated by about 3—4 inches. Arms loose—Easy swing of parallel arms from side to side. As right arm reaches horizontal continue its movement by raising the chest and shoulder. The body turns to right—the weight is transferred to right hip. The left arm follows through to about horizontal—the left knee and toe ease slightly—half turn to right—keep leading arm in transverse plane. The hand is kept as far away from the body as possible, i. e., describes the widest possible arc—the forearm bends back so that palm looks to ceiling—right eye fixes hand which is directly over: at top of swing just at start of return, reach for ceiling. Reverse and go through same with left, alternating. The attention is entirely on the leading arm—muscles from hip up should be felt to be put on stretch. Alternate rhythmically with same done on left. Do not sway! (See Fig. 22 for final).

NUMBER 20

Upper arms drawn in very closely to sides—forearms flexed to right angle—make one-piece-arm (flexed), fingers and hands forcibly extended—thumbs out—now turn arms as whole round body to the rear—direct-

ing thumb backward—keep elbow point fixed at side—hunch shoulders—throw chest forward as shoulder rotates back—alternate the motion of shoulder and chest. (See Fig. 23 for final).

NUMBER 21

The bent arm drawn in as closely as possible to upper chest, elbow rests in nipple line—open arms by pushing body back against them—chest remains raised and upper arm is kept in same position, hugged closely to chest—the push of body backwards corresponding exactly to forward motion of hands. Hands kept at level of mouth—the motion is governed entirely by bulge of chest and heave of body. (See Fig. 24 for final).

NUMBER 22

Same, but forearm drops to position 45 degrees. (Not figured).

NUMBER 23

Same—more on side—forearm goes *lower* at sides—Finally push hard with arms and draw up and back with body, neck and head. (See Fig. 25 for final).

NUMBER 24

One-piece-arm extended at side—hand, also fingers, drawn back forcibly at wrist. Raise arm to rear as far as possible, inclining body forward—muscular action is in back of shoulder—do not relax arm in the

DIRECTIONS FOR THE MOVEMENTS 131

slightest (See Fig. 26 for final)—pay great attention to extending fingers and hand (bend back at wrist). This forces use of back shoulder.

NUMBER 25

About the same, but arm drawn up more—forearm right angles with arm—try to put elbow as far back as possible—do not relax arm. (See Fig. 27 for final).

NUMBER 26

The Dip—Support extended body by arms—body close to floor—push body up by straightening arms. *Complete by drawing head back and heaving chest*, as in other motions. (See No. 18). Let chest touch floor—keep body firm—This is a chest movement. (See Fig. 28 for final).

NUMBER 27

Squat down to floor—keep head steady and body as vertical as possible—keep heels on floor and raise toes a little—rotate shoulders on chest as you go down—a combined balance and chest movement. (Not figured).

NUMBER 28

Body firm—bend backwards—look toward ceiling—throw arms and shoulders upwards till shoulders are completely hunched with hands as near ceiling as possible—keep in this position and bring arms forward as a whole, as if to touch toes. Keep the tips of fingers

the farthest possible distance away. This movement a stretch for body and spine. If properly done toes cannot be touched. It often compels a step or two forward (See Fig. 29).

NUMBER 29

Draw chest up and head back—one-piece-arm, and shoulders rotated (See Fig. 36)—Contract muscles of back of neck so that face looks to ceiling—Draw back of head down towards heels, curving back and relaxing knees. Feel especially the muscles along spine and at the back of neck contract. The body as a whole arches—the muscles from heel to head act as a bow string. (Not figured).

NUMBER 30

Draw head back so that face looks to ceiling—keep head well drawn down between shoulders. Now roll head from side to side, keeping muscles at back of neck as firmly contracted as possible. (Not figured).

NUMBER 31

Draw head back and high—drop right ear towards right shoulder and draw head to the front in this plane—reverse and do same on left—(For muscles at side of neck, particularly the sterno-mastoid running from skull behind ear to breast bone and collar bone). (Not figured).

DIRECTIONS FOR THE MOVEMENTS 133

NUMBER 32

Stand very erect—Draw head up to right, turn and look at moulding of room—follow this along to back corner of room by drawing on head and body. Draw body and head up and back as much as possible. Same on left side. (Not figured).

NUMBER 33

Forearm at right angle to arm, somewhat away from side—hand as high as mouth, fingers and thumbs close and extended—thumb side up—extend hands to farthest possible point with utmost stretch—hunch shoulders as much as possible, drawing head down between—then rise on toes—keep arms in exactly same lateral plane—keep hands always as high as mouth. (See Fig. 30 for final).

NUMBER 34

The Set-up Movement—(The Invocation to the Great Spirit)—described in the chapter on Poise and Set-up, pp. 60-61,—See. Figs. 31, 32, 33, 34, 35, 36. Combines the groups of muscles as they have been involved in the separate movements. *Cf.* especially Nos. 1, 2, 8, 11, 23, 29.

NOTE

THERE was no one at hand better practised in these movements than the author himself. He evolved them years back in correspondence with his ideas, and has steadily made use of them. Thus these glimpses may serve at once the purpose of punctuating the descriptive text and of displaying results perhaps.

Let not the eye fall at once on *quantity* of muscle, though it is to be feared it will—such is the force of habit in associating exercise with so-called development. For muscle by itself we have, as the reader must know, but scant respect. The way thereto is straight and narrow. Work, against weight and resistance, with emphasis on the *work*, is the formula.

Even in these movements, though, there is involved a very considerable amount of antagonism between parts of the body and groups of muscles, together with very wilful contraction; therefore we may modestly claim that the muscle is in due proportion.

Believing as we do that a muscle that can and will raise the collar bone, in response to its owner's command, is worth more than a biceps that can "curl" a 75 lb. dumb-bell, we refuse to be longer dazzled by muscle.

Speak as the pictures may for all they can, they still will fail to demonstrate much of what we claim in the way of end-results, viz.,—influence on breathing and circulation, tone of ligaments and muscles, use of finer muscles, and the conscious control of the body.

The pictures are not poses. The movements are starting, doing, or done; though in the set-up there are half-way stops that we trust may indicate the gradation of the action.

We may assert with the utmost confidence that these movements have stood the test of time, practice, and application. The assurance may be given that not only will they do no harm, (there is no such imputation due *all methods*) but will do a lot of good for anybody persisting with them. By no means easy to acquire, they will come better and better with repetition, with realization of their aims, and with growing ability to bring into conscious play the particular muscle power as required.



FIGURE 1
Movement Number 1—Final



FIGURE 2
Movement Number 2—Final



FIGURE 3
Movement Number 3—Final (approximate)



FIGURE 4
Movement Number 5—Final



FIGURE 5
Movement Number 6—Half-way



FIGURE 6
Movement Number 6—Final



FIGURE 7
Movement Number 7—Midway



FIGURE 8
Movement Number 7—Final



FIGURE 9
Movement Number 8—Ready!



FIGURE 10
Movement Number 8—Final



FIGURE II
Movement Number 10—Finish



FIGURE 12
Movement Number 11—Final



FIGURE 13
Movement Number 12—Ready!



FIGURE 14
Movement Number 12—Finish



FIGURE 15
Movement Number 13—Ready!



FIGURE 16
Movement Number 13—Final



FIGURE 17
Movement Number 14—Ready!



FIGURE 18
Movement Number 15—Final



FIGURE 19
Movement Number 16—Finish



FIGURE 20
Movement Number 17—Final



FIGURE 21
Movement Number 18—Final



FIGURE 22
Movement Number 19—Finish



FIGURE 23
Movement Number 20—Final



FIGURE 24
Movement Number 21—Final



FIGURE 25
Movement Number 23—Final



FIGURE 26
Movement Number 24—Final

100



FIGURE 27
Movement Number 25—Final



FIGURE 28
Movement Number 26—Final

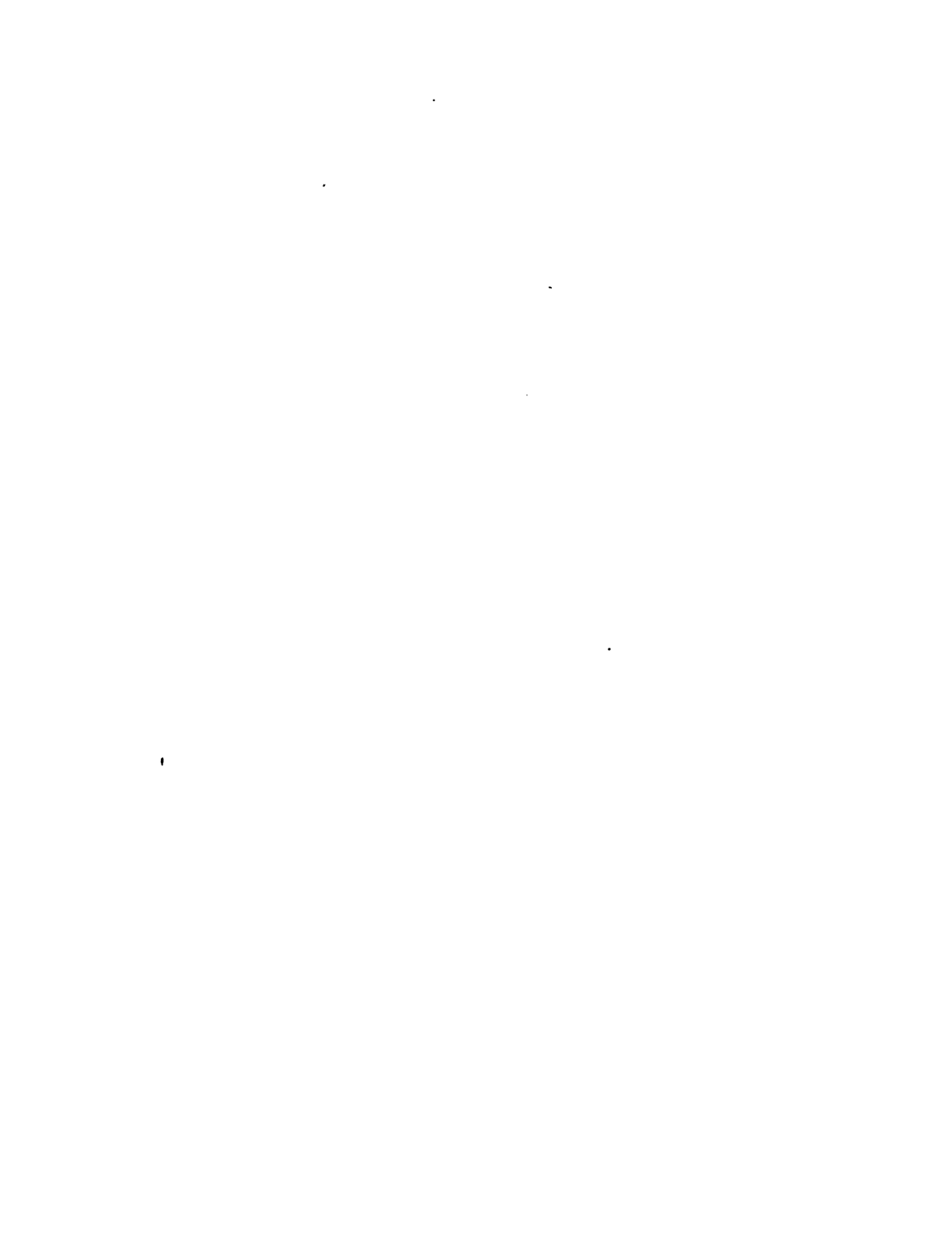




FIGURE 29
Movement Number 28—Midway



FIGURE 30
Movement Number 33—Final



FIGURE 31

The Set-Up: First Phase—(Slack) "Tend the Braces!"

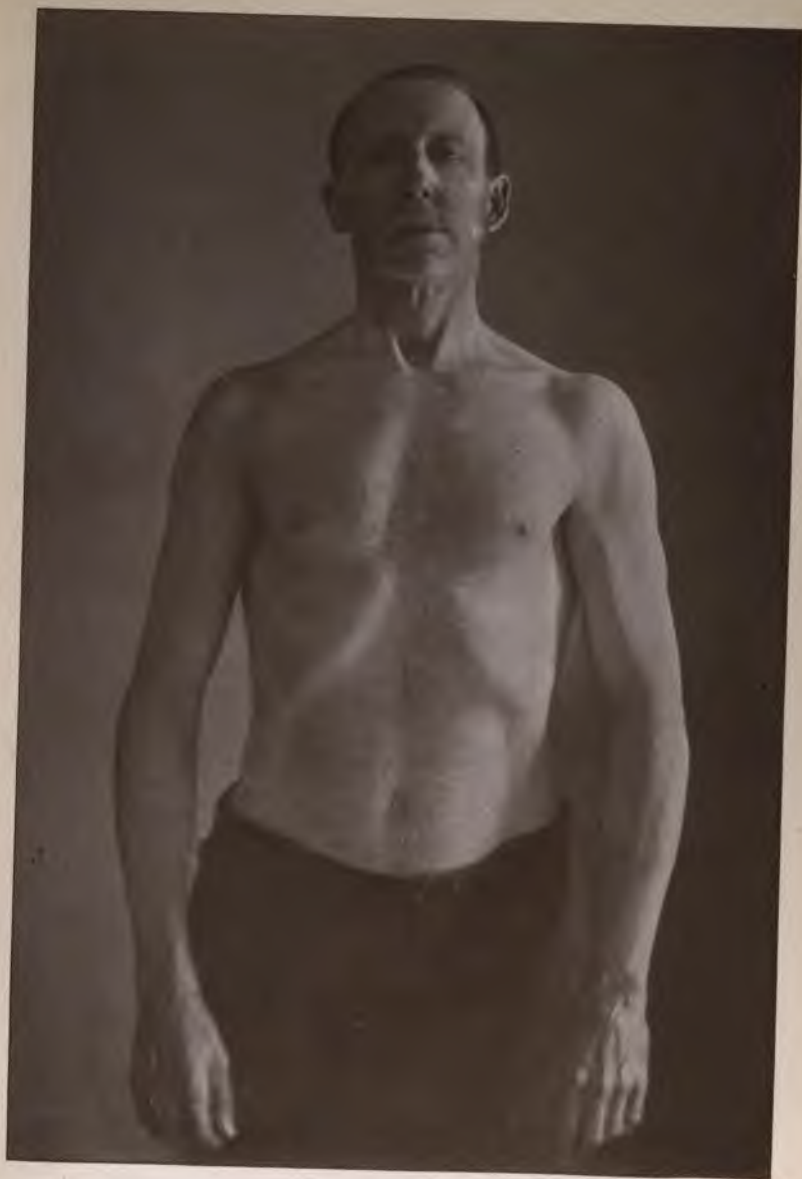


FIGURE 32

The Set-Up: Second Phase—"Hoist-away!"



FIGURE 33
The Set-Up: Third Phase—"Brace back!"



FIGURE 34
The Set-Up: Fourth Phase—"Round up Sharp!"

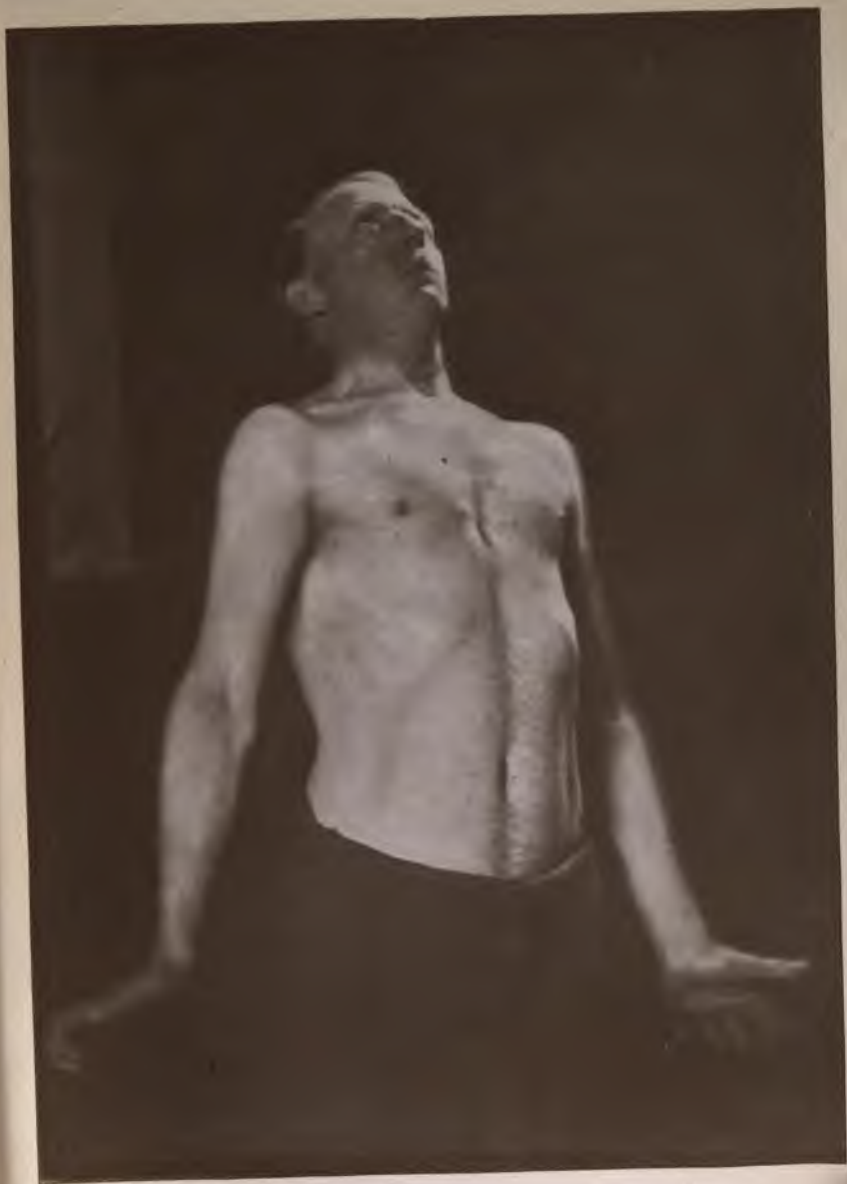


FIGURE 35
The Set-Up: Fifth Phase—"Taut-hauled!"
[Invocation to the Great Spirit]

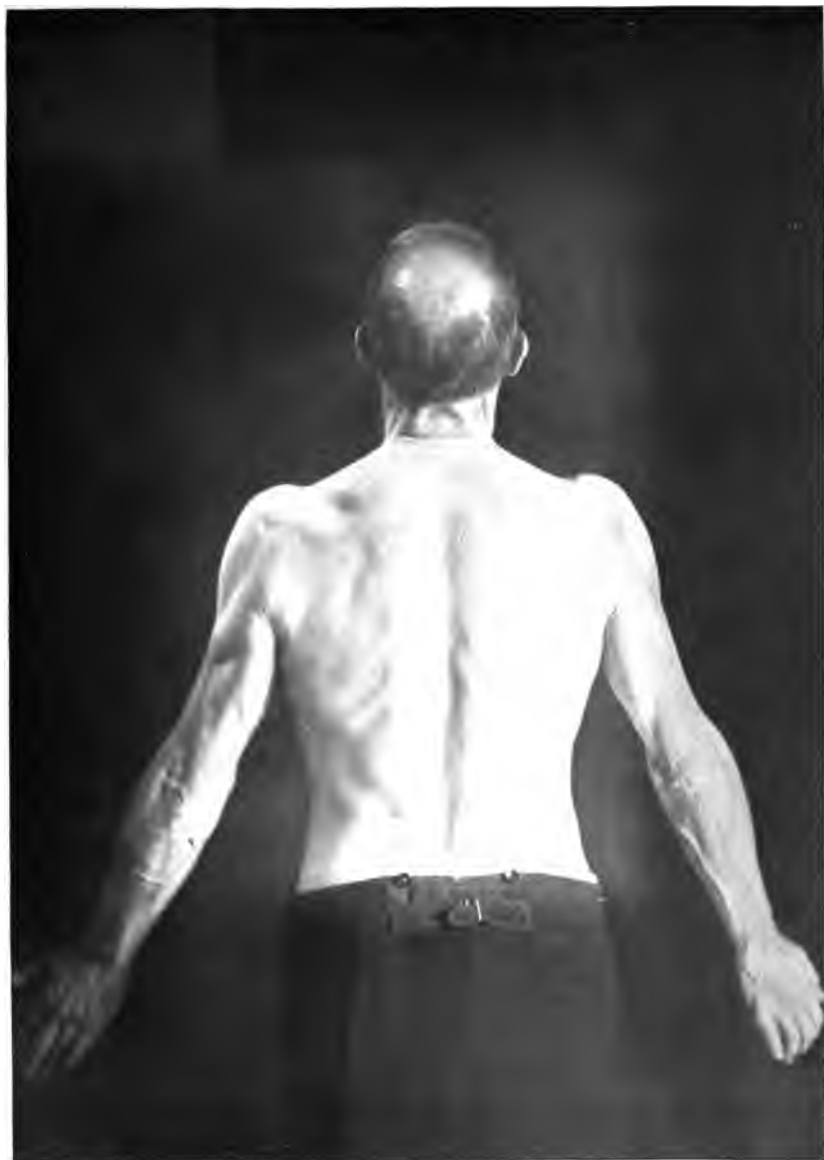


FIGURE 36
The Set-Up: Final—Back View



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